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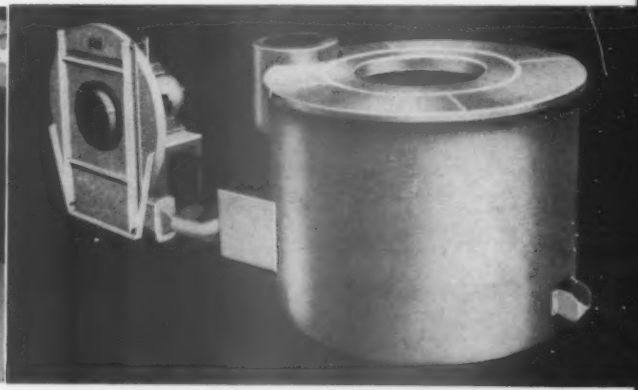

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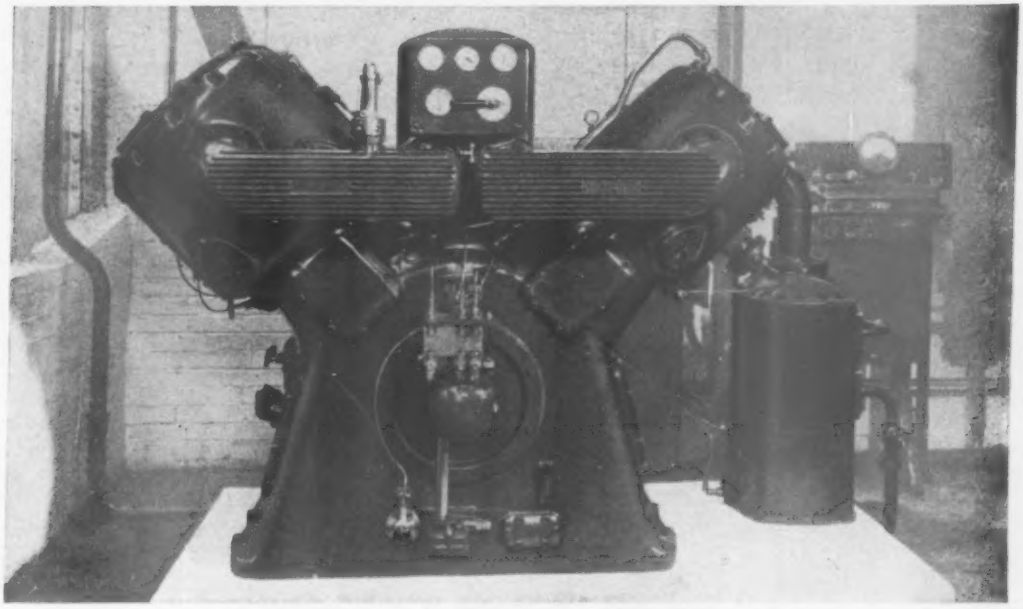

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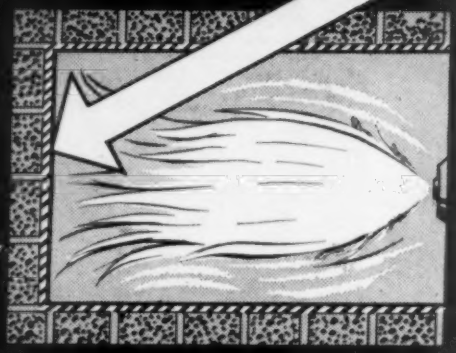

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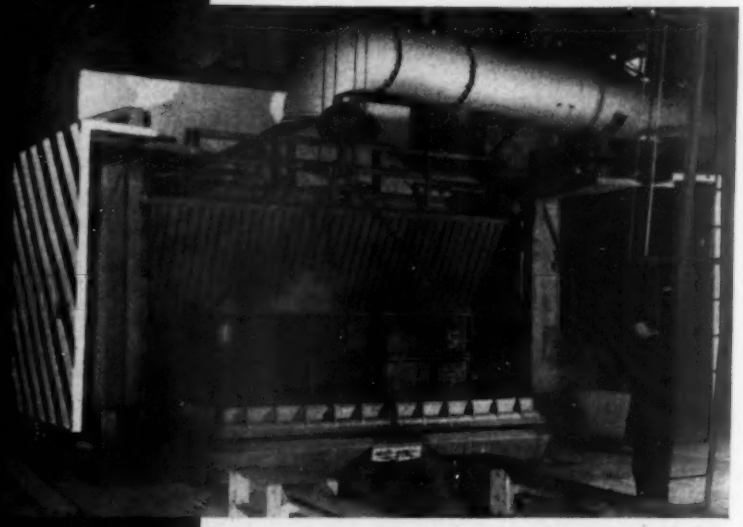
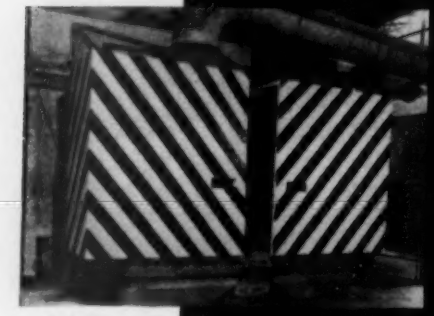


The photographs show the doors in both the open and closed positions.



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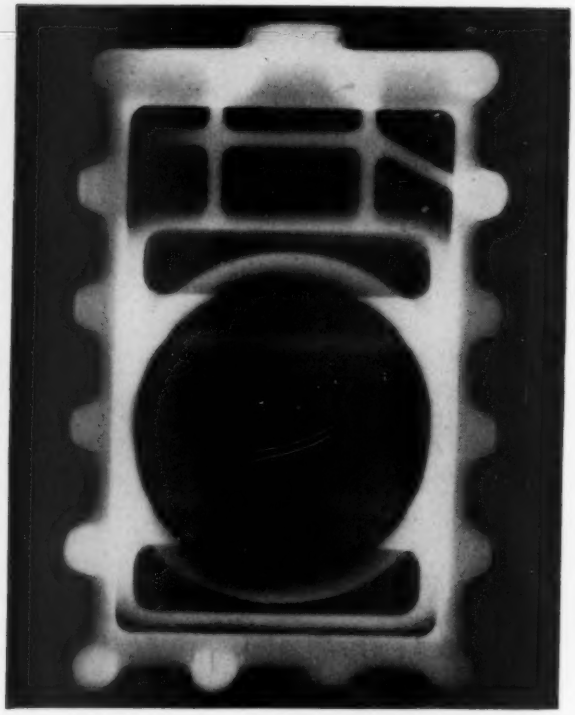

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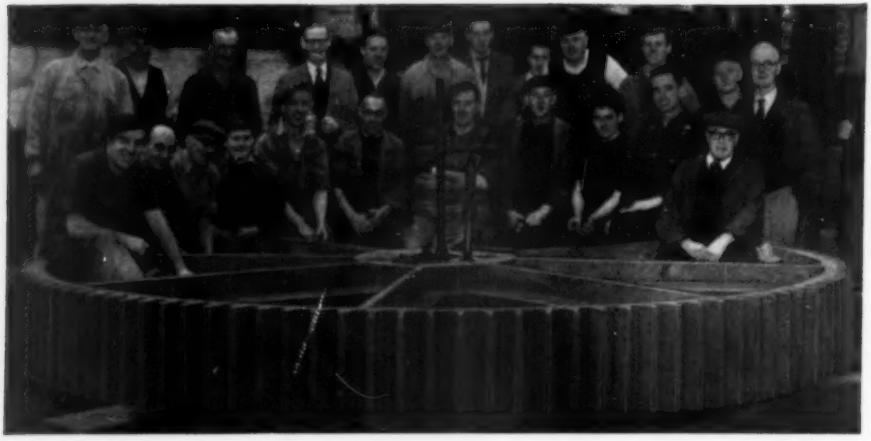

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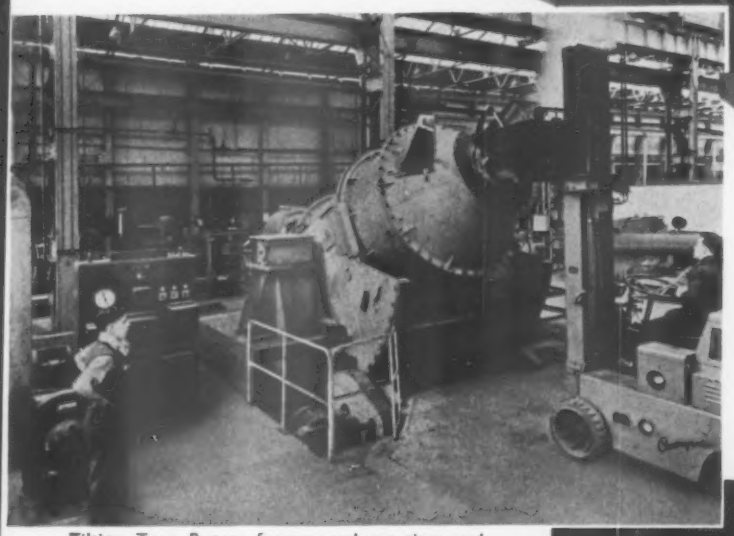

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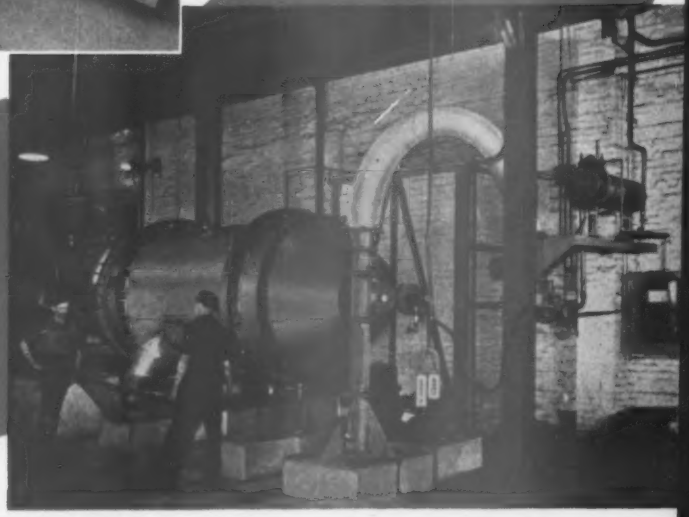

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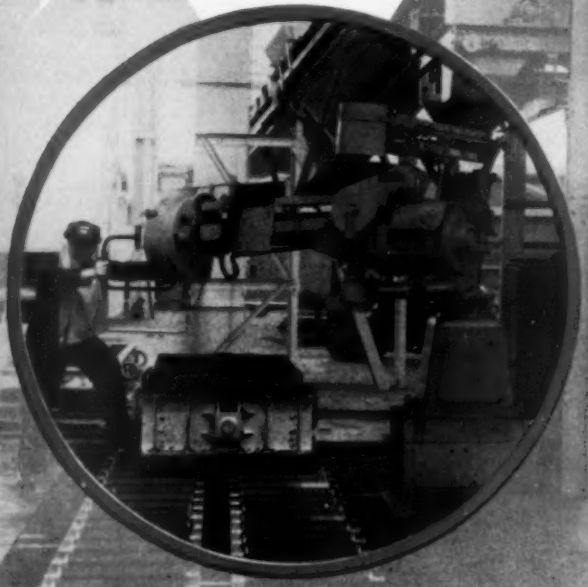

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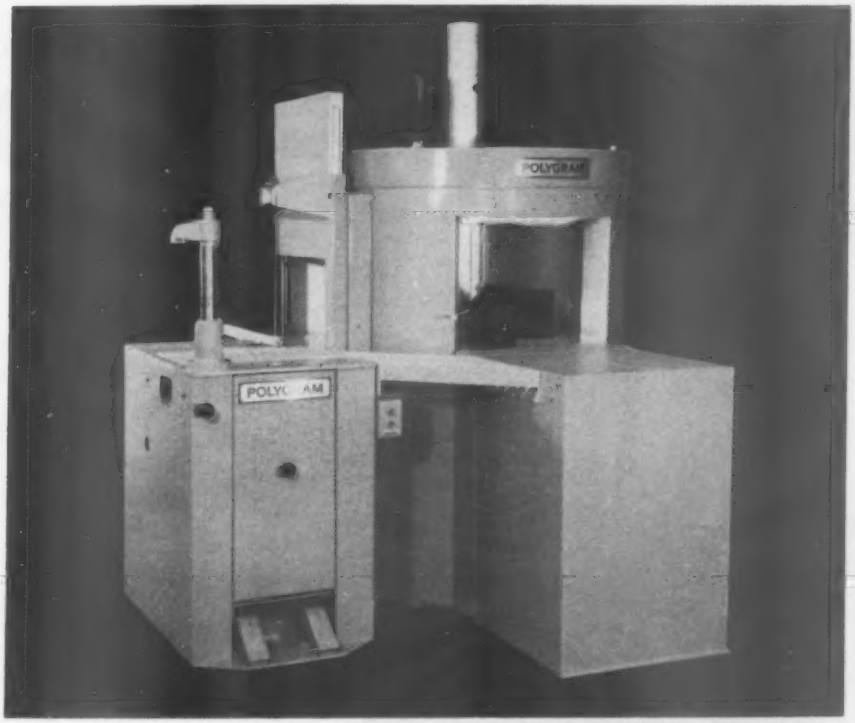

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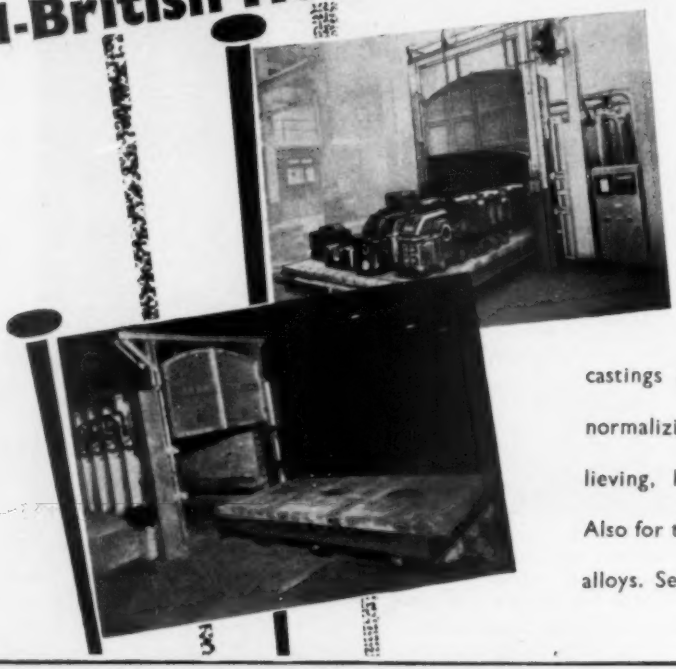

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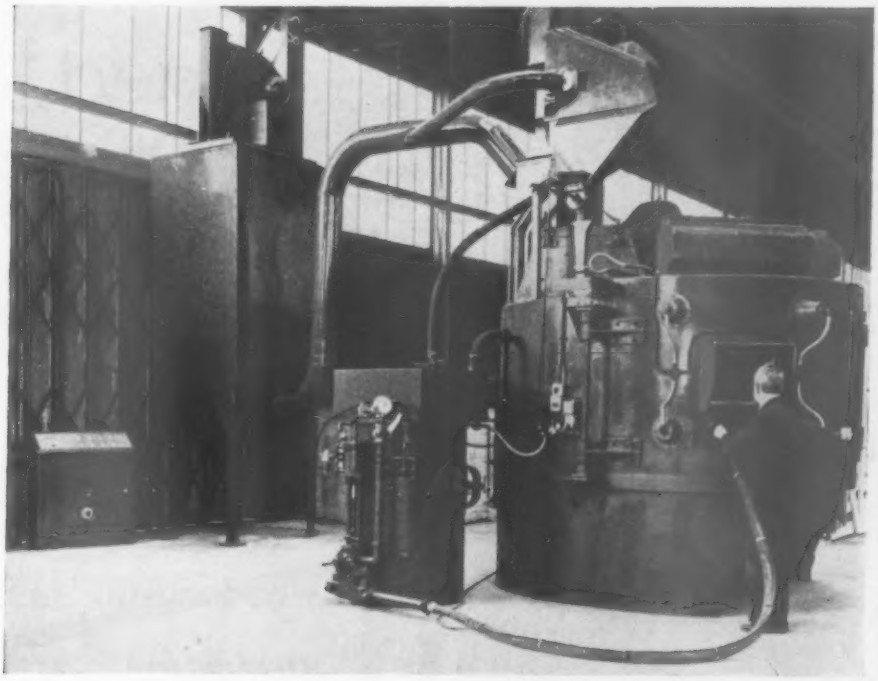

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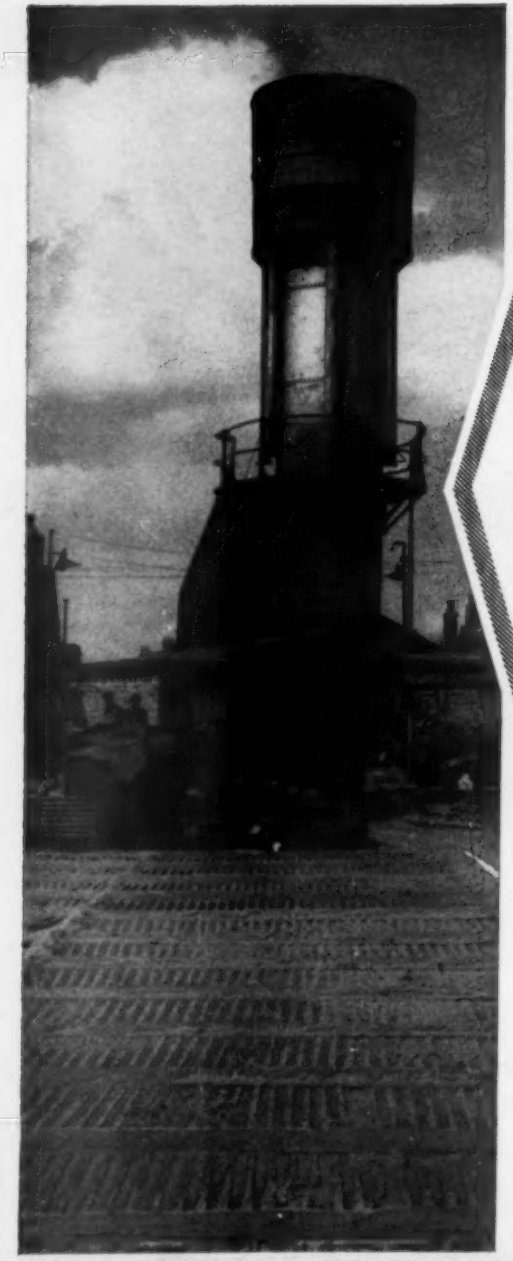

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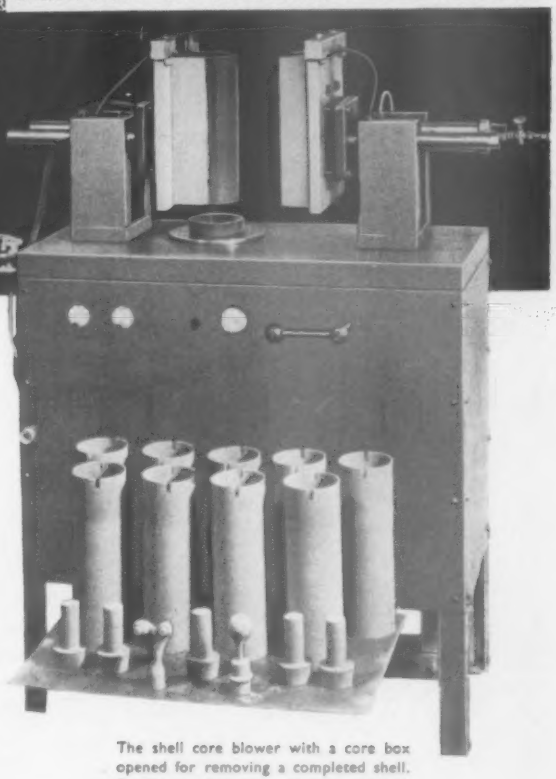

The shell core blower with a core box opened for removing a completed shell. Energy regulators, pressure gauge and control lever are mounted on the front panel. Some specimen cores are shown in front of the machine.

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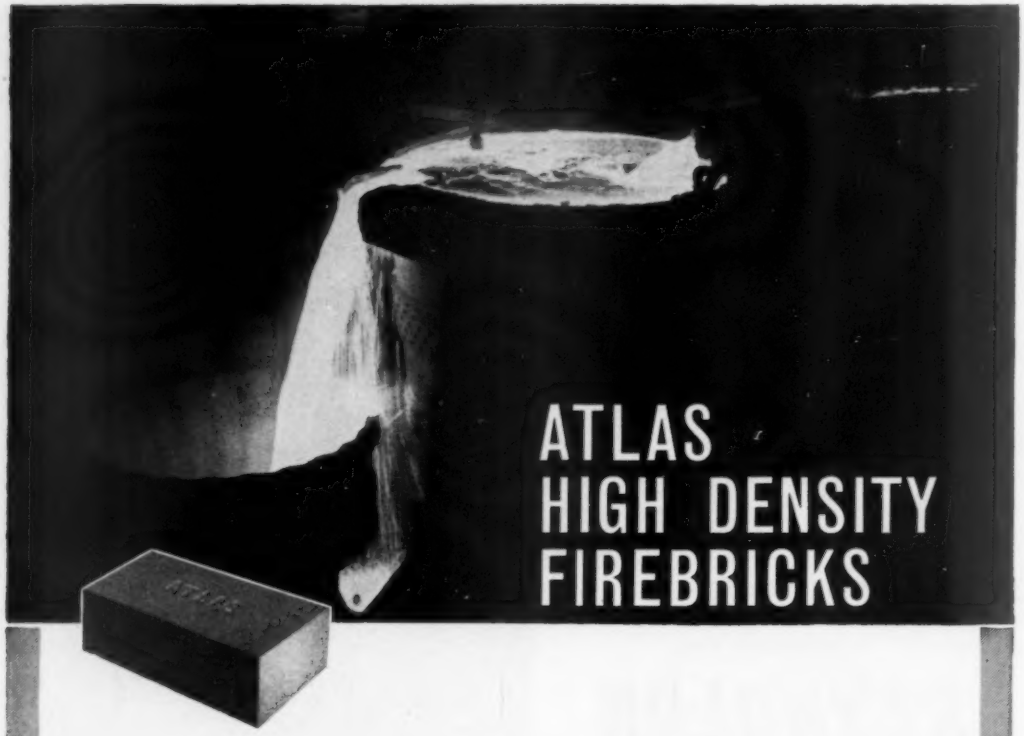

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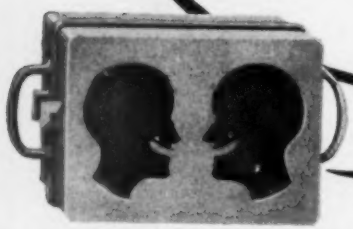

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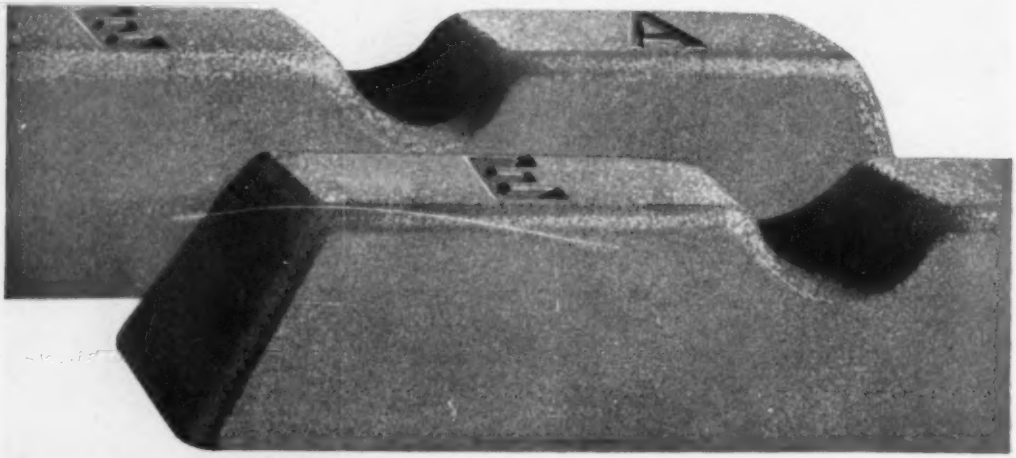

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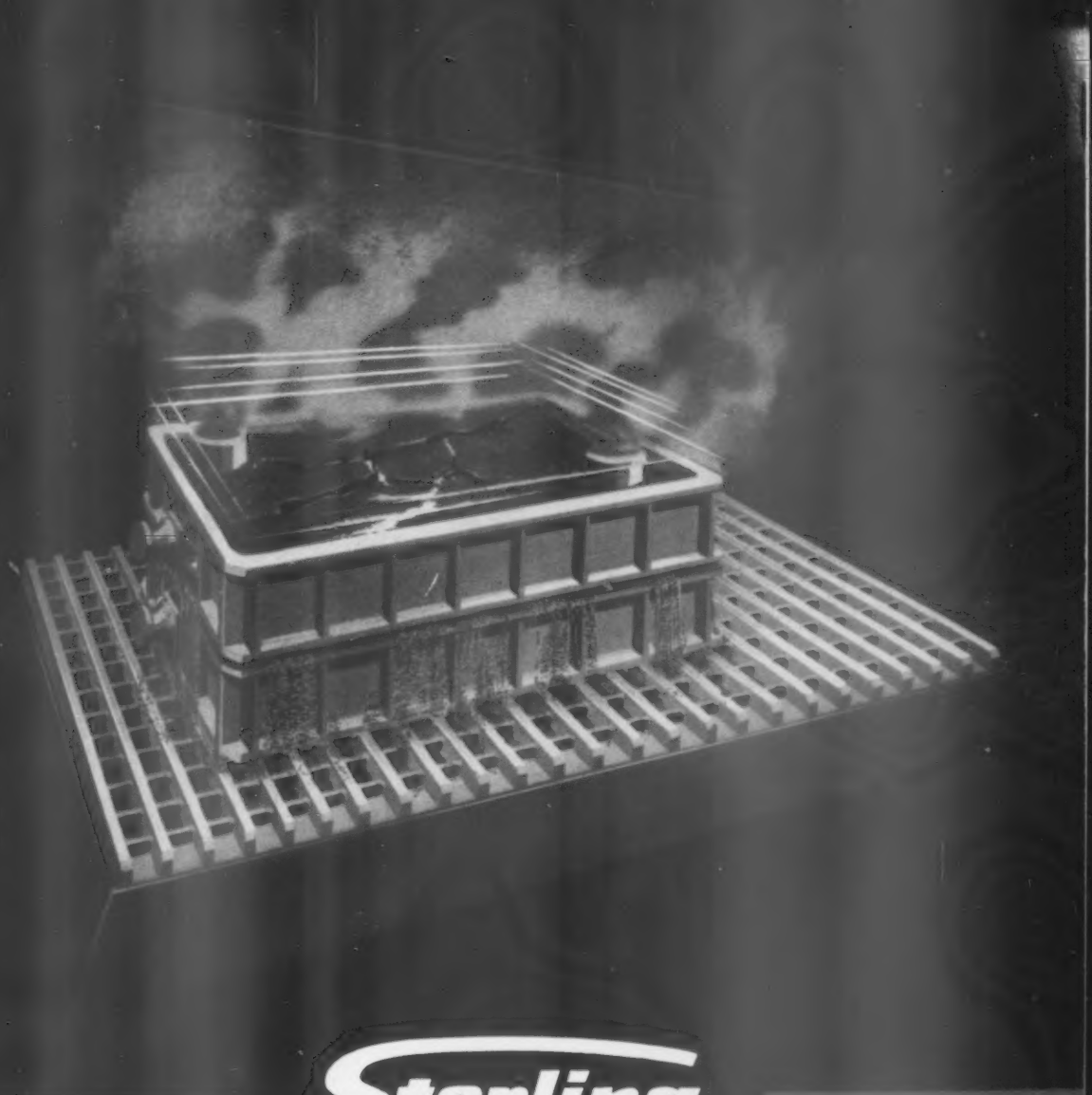

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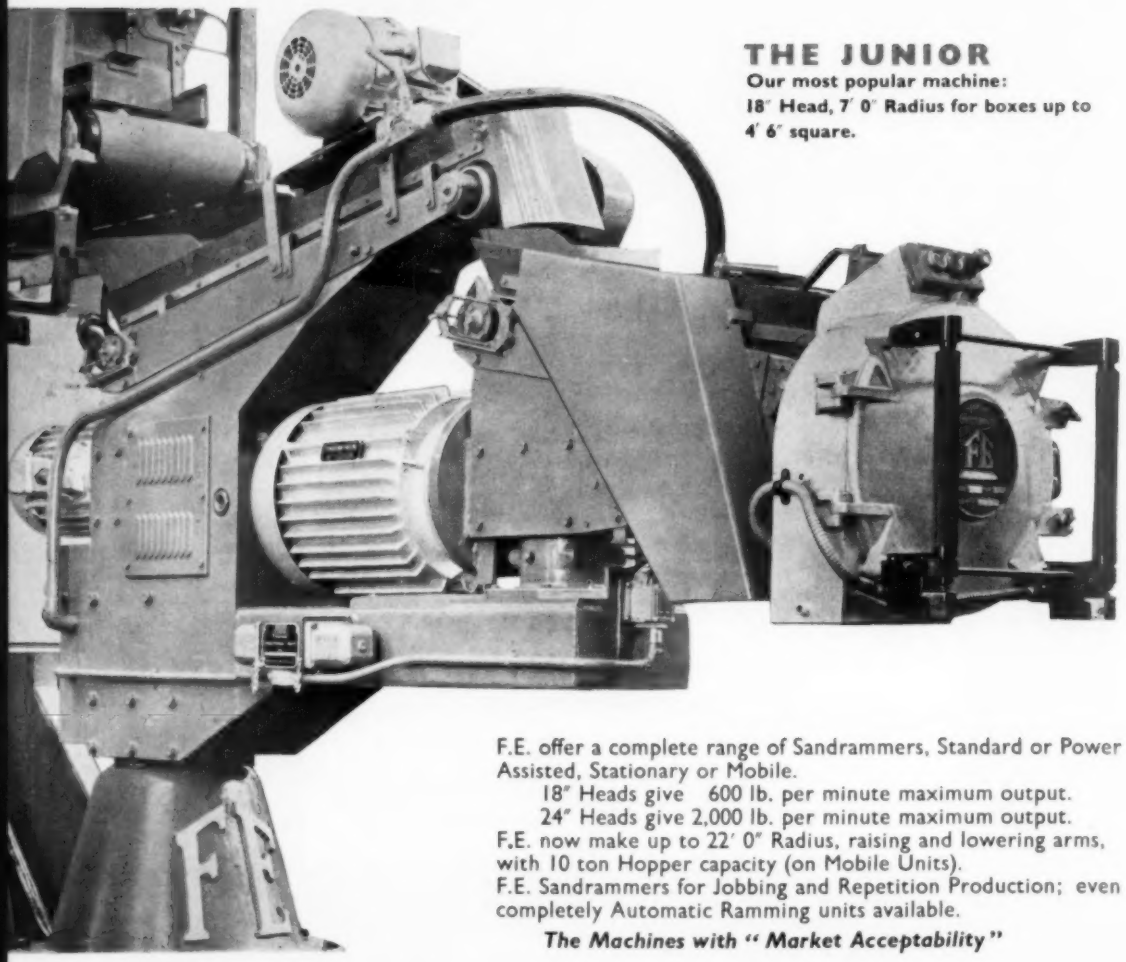

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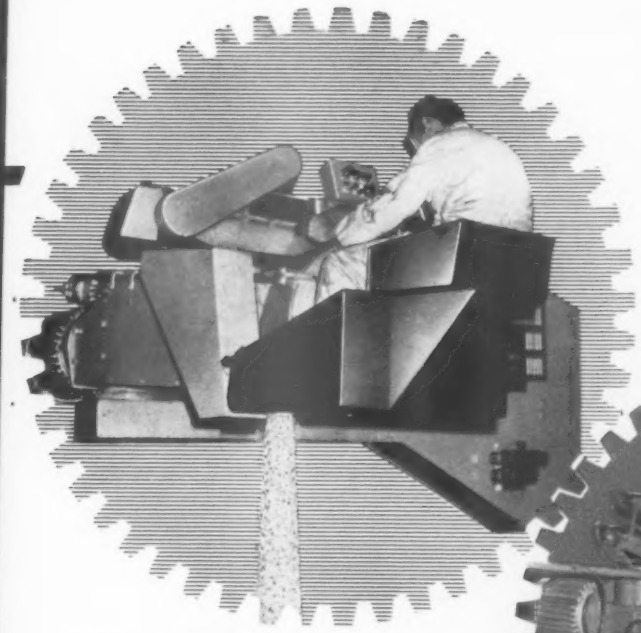

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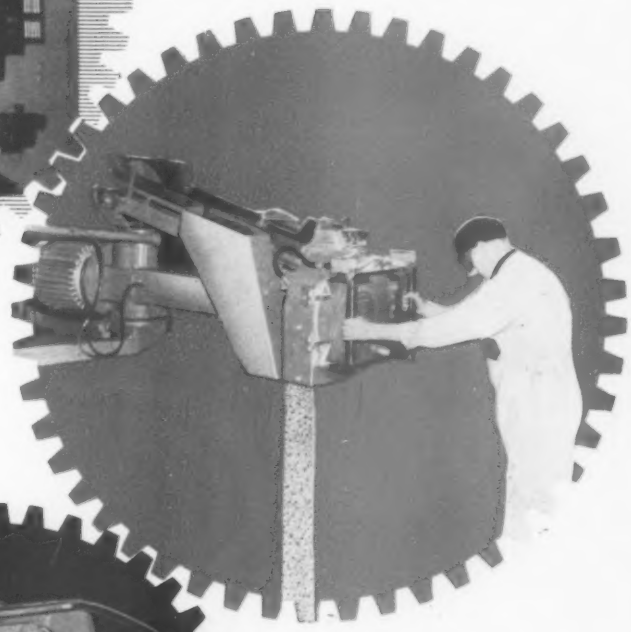

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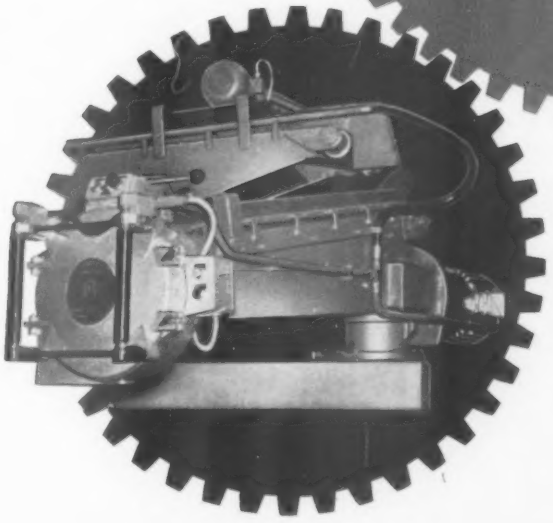

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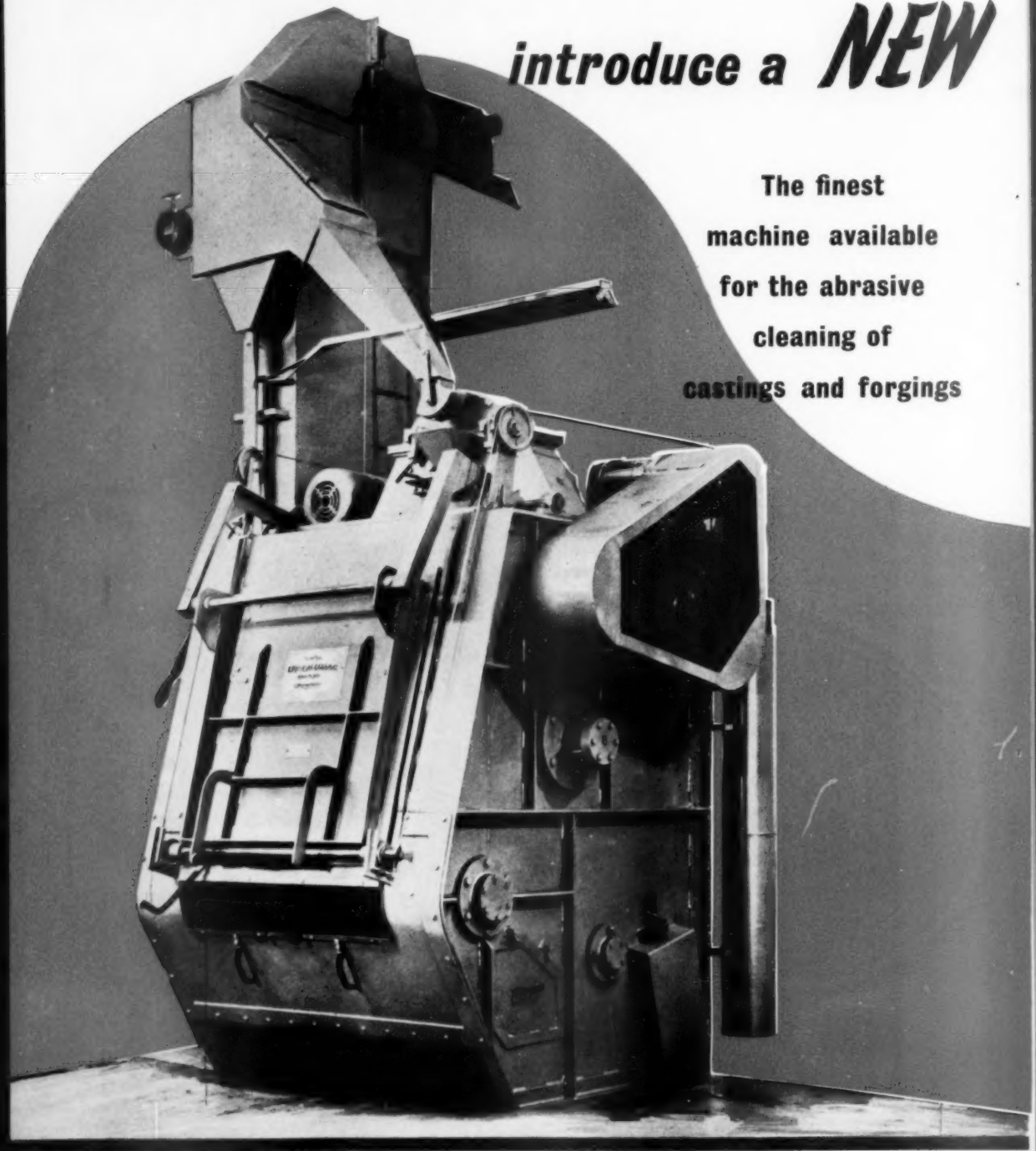

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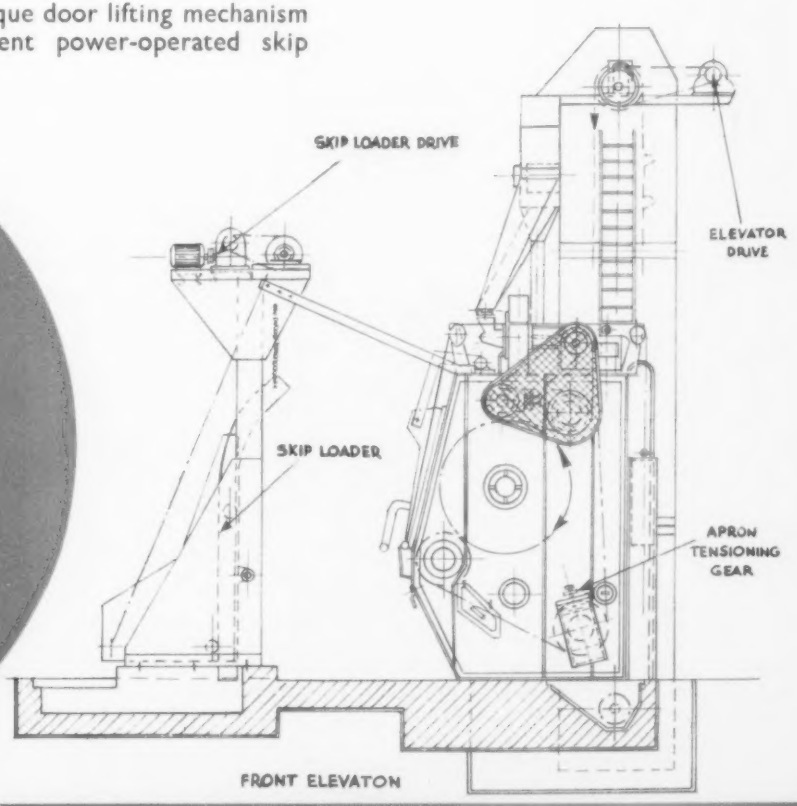

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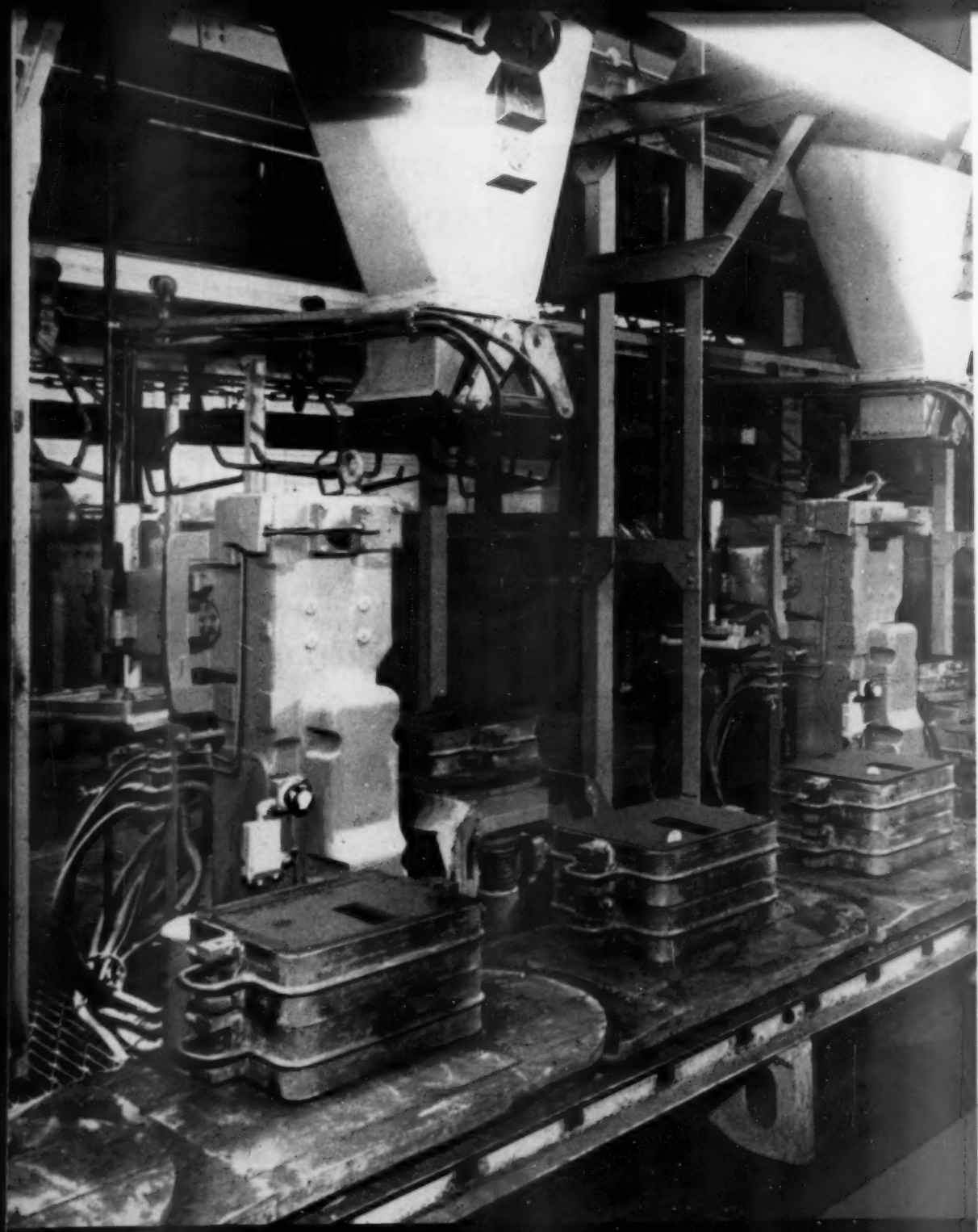

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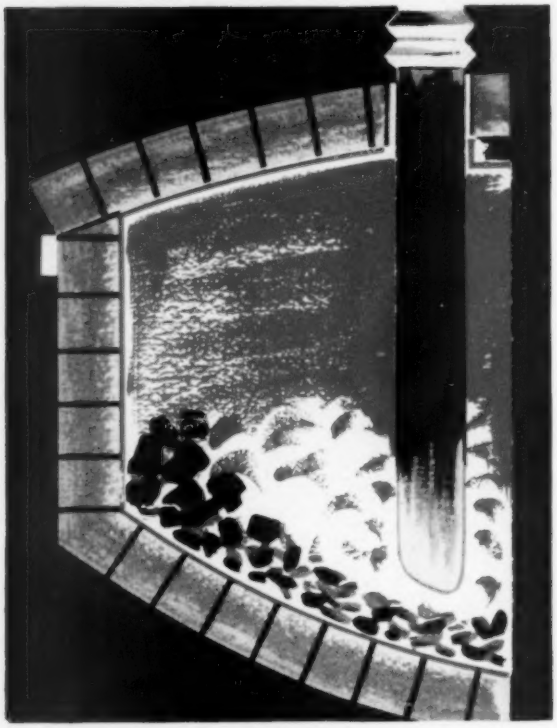

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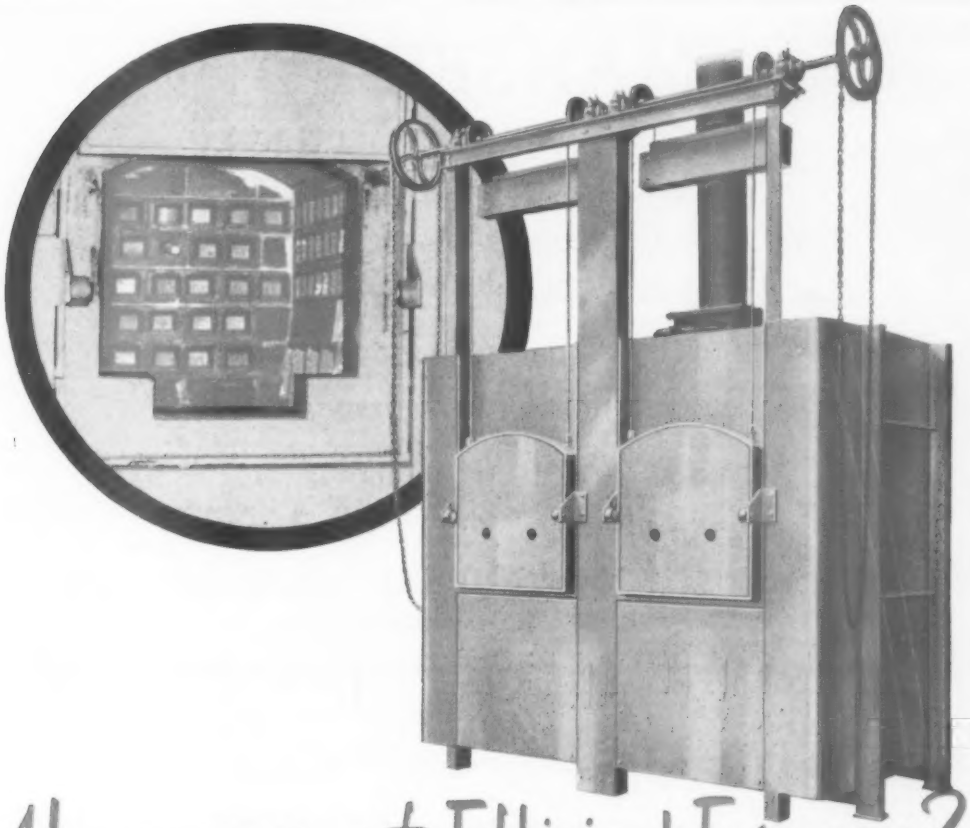

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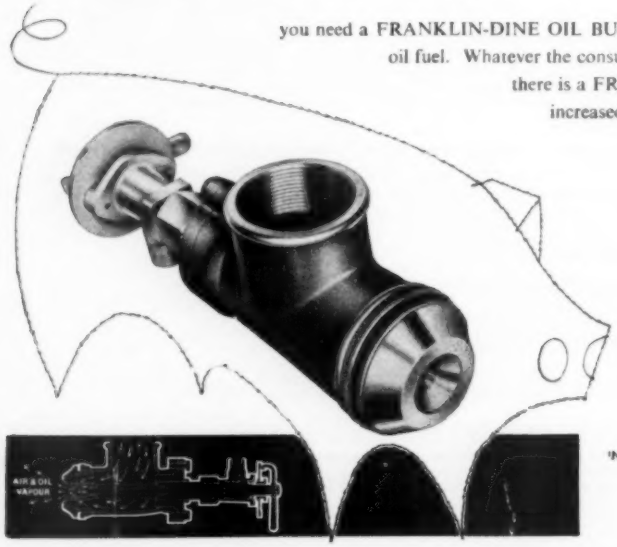

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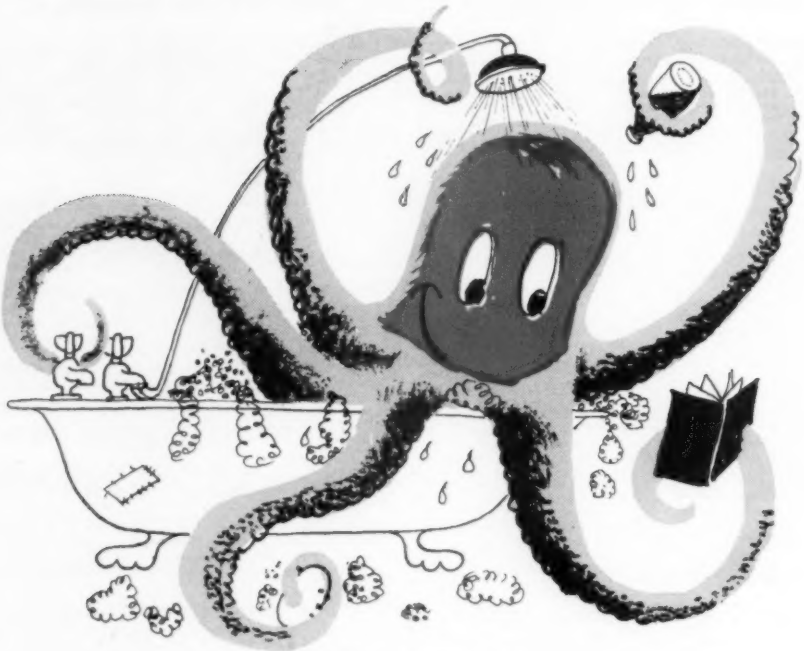

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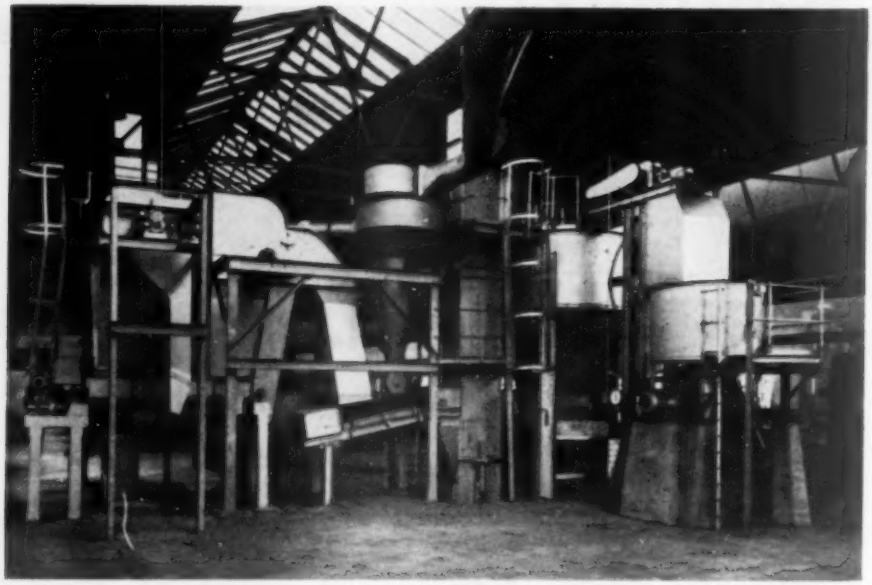

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FOUNDRY
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Meat or Poison?

It is taken for granted that what is one man's meat is another man's poison, yet there is no logical reason why this should be so. When the same new plant or process is installed in two foundries and in one it is a success and in the other a failure, it is usually passed off as being due to the different conditions obtaining. This explanation cannot be entirely accepted and more usually success or failure can be ascribed to the human approach of a firm's staff to the innovation. Lack of success can be attributed to a number of reactions and fear is one of them—that is, fear on the part of personnel because they are unable to grasp and operate something new to them. Fortunately this—in time—can usually be overcome. At the other end of the scale, is the reaction of the type of person who thinks that he " knows all about it " and being a practical man he can, without experience, introduce process changes even without bothering to read instructions. This type of person can produce results even more disastrous than the man who is afraid.

A simple example might be the replacement of lip-pouring ladles by the stopper-and-nozzle system. An experienced manager or foreman carefully instructs a man just how this should be done. Following this, half a dozen casts are successfully made and then a mishap in the form of a running stopper is experienced; investigations show that the operator thought he had found a " short cut " or " better way " to carry out his work. Again, when a new process and a piece of plant is installed, the purchaser is usually supplied with instructions in some form or other. These are not drawn up lightly and should therefore be followed with meticulous care. If results are not satisfactory and before any changes are made, a statement should be prepared giving all the facts of the case and this referred back to the suppliers. Then and then only with co-operation of the supply firm should changes be made and the results again set out. In this way, orderly progress can be achieved.

Such a method will reveal whether a specification has been met or the claims for a process established. New processes and practices are more susceptible to failure than machines and it is wise, initially, to establish beyond question the existing position before experiments are made—especially as to costs and quality of product. Shell-moulding is sufficiently recent a development to serve as an example. Here costs are increased, but the resulting castings are in general of greater dimensional accuracy and worthy of a higher price on the market. The CO_2 Process, where the suppliers' instructions have been carried out, is capable of reducing costs and time of manufacture. Yet in a few cases where installed, it has turned out to be more " poison " than " meat." Not all failures are mechanical, some are human !

Dinners

ALLIED IRONFOUNDERS, LIMITED

"I am determined that there will be no increase in the price of coal as long as I am chairman of the National Coal Board," said the Rt. Hon. Alfred Robens, on Monday of last week.

Mr. Robens was replying to the toast of "The Guests" at Allied Ironfounders' Merchants' Conference* during a dinner at Quaglino's in London's West End. The dinner was attended by approximately 330 Conference members and guests, with Mr. G. S. Steven, chairman and joint managing director of Allied, presiding. The toast of "The Company" was proposed by Councillor Percy C. Jones, J.P., of South Wales Builders' Supply Company, Limited, of Newport, and Mr. Steven replied. "The Guests" was proposed by Mr. H. C. Wilson Bennetts, joint managing director of Allied Ironfounders, the second reply to this toast being made by Alderman J. K. Fisher of Sharpe & Fisher, Limited, of Cheltenham.

Continuing his theme when replying to the toast, Mr. Robens said that to ensure price stability in the coal industry would be an enormous task in view of the increases in raw-material costs which were always coming along. It was intended, however, that these should be offset by increased productivity stemming from large-scale mechanization in the pits, though this, too, brought enormous problems. Elsewhere in his speech, Mr. Robens was extremely complimentary of Allied Ironfounders, particularly their efforts in 1947 when the firm had co-operated with him in modernizing a mining village in the north of England. He described the NCB as probably a larger employer than any other organization in the world—it employed more than the total British armed forces. Amongst other remarks, he said that the NCB would shortly be launching a sales drive in co-operation with Allied Ironfounders with joint advertising for solid-fuel-fired central heating. A brand-new smokeless fuel would be on the market in a few months' time.

After the speeches, the dinner was concluded by light entertainment, with Hylda Baker, Anne Shelton, Harry Worth and Tommy Kinsman's quartet making up the cabaret, compèred by Jerry Desmonde.

INSTITUTE OF METALS—LONDON LOCAL SECTION

Close on 100 members and guests of the London local section of the Institute of Metals attended the section's fourth annual informal dinner on Thursday of last week at the Horse Shoe Hotel, Tottenham Court Road, London. Mr. E. G. V. Newman, O.B.E., the president, was in the chair and after the Loyal Toast he called on the principal guest, Mr. H. Goodger, of the National, Boiler & General Insurance Company, Limited, to give a talk on some of his experiences during a long association with metallurgical inspection. Talks on subjects out of their ordinary run of business have been a feature much-appreciated by members at previous gatherings of this type.

Mr. Goodger first referred to his early foundry experiences and then went on to give a number of anecdotes relating to metallurgical inspection. Failures, he said, were more often the result of bad design and engineering than metallurgical causes. He then quoted unusual examples of penetration of one metal by another, sometimes where the "pirate metal" came from quite unexpected sources. Like many other research workers, he had often found that the artificial stimulation of defects as a means of checking a hypothesis were most difficult to stage and quite unpredictable in results. Among other accounts, he told of how he once prepared bronzes by melting copper in an ironfoundry cupola and adding the tin at the spout. Discussing hydraulic testing, he mentioned its possibilities and also its limitations, his view being that a time factor could be introduced with advantage. All materials, Mr. Goodger said, whether cast or wrought, have some defects and it was his job to assess whether or not they were deleterious. To impress upon his listeners the need for "inspecting" the inspection tests themselves, he quoted an experience he had had when travelling overseas to examine some metal components. First he had been shown an ultra-well-equipped laboratory of which his opposite number was very proud. Later, in one of the specimens he was examining he had suspected a defect in a certain position. "No, there's nothing there," he was told, "we've gamma-radiographed every centimetre." "You can see something even with the naked eye," he persisted. "But we never examine anything here with the naked eye," came the astounding reply.

To conclude his remarks, Mr. Goodger advised metallurgists to learn more about engineering, because it was in applying their knowledge to practical problems that to-day's weakness lay. A vote of thanks to the speaker was proposed by Dr. W. I. Pumphrey, PH.D., seconded by Dr. E. C. Rhodes, B.SC., F.I.M., and the proceedings terminated with informal discussions.

* Reported elsewhere in this issue.

Forthcoming Events

MARCH 20

Institution of Production Engineers

East & West Ridings section: "Work-study," by G. A. Daniell, 7.30 p.m., at the Hotel Metropole, King Street, Leeds.

Institute of British Foundrymen

East Anglian section: "Accuracy in Moulds and Cores," by W. B. Parkes, 7.30 p.m., at the Civic College, Grimwade Street, Ipswich.

MARCH 21

West of England Metallurgical Society

"Physical Methods of Analysis," by K. M. Bills, 7.30 p.m., at the College of Technology, Ashley Down, Bristol, 7.

Institution of Production Engineers

Stoke-on-Trent section: "Management, Selection and Training," by F. W. Twymdale, 6.15 for 6.30 p.m., at Pitfield House, Newcastle-under-Lyme. (Joint meeting with the Institute of Personnel Management.)

MARCH 22

Engineers' Guild

One-day conference on the "Professional Engineer—His Employment and Development," at the Connaught Rooms, Great Queen Street, London, W.C.2, commencing 9.45 a.m.

Institute of British Foundrymen

London branch: "New Ideas in Melting," by W. B. Lawrie and E. Ayres, 7.30 p.m., at the Constitutional Club, Northumberland Avenue, W.C.2.

Birmingham branch: "Coremaking in Hot Boxes," by Mr. Jasson, 7.15 p.m., in the Lecture Hall of the Byng Kendrick Suite, College of Technology, Gosta Green, Birmingham.

MARCH 23

Institute of British Foundrymen

Wales & Monmouth branch: "Introduction of a Methods and Planning Department in a Steel Jobbing Foundry," by J. Greatrex, 7 p.m., at the Engineers' Institute, Cardiff

UNITED DOMINIONS TRUST has opened a new branch office in Bradford at 33, Kirkgate, Bradford, Yorkshire.

American Foundry Technology

Lengthy abstracts from four papers of relevance to the foundry industry presented to American technical societies at various meetings last year.

Effect of Inoculation on the Risering of Grey Iron*

By H. D. Merchant and J. F. Wallace

The investigation described in this paper was carried out to determine the reason for increased shrinkage or risering† (feeding) requirements of grey iron, resulting from inoculation of metal poured into greensand moulds. It was hoped that by determining the cause of this shrinkage behaviour, methods of reducing the feeding requirements of inoculated irons might become apparent, or at least the mechanism might be understood so that appropriate feed metal could be provided when necessary.

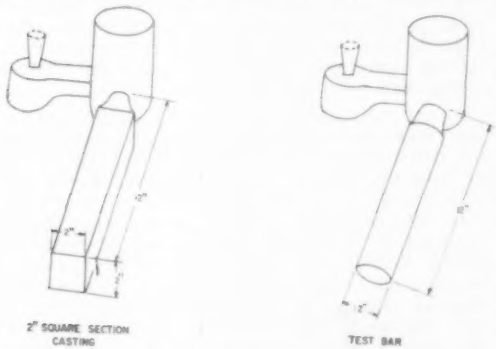

FIG. 1.—*Sketches of the test castings employed, with gating and feeding systems attached.*

Procedure

The castings used in the investigation were a 2 by 2 by 12-in., square-cross-section bar and a 1.2-in. dia. 12-in. long test-bar, both cast horizontally with one feeder-head located at one end. The castings were gated tangentially into the feeder-head (Fig. 1) and the dimensions of the gating system, feeder-head and feeder-neck were obtained by calculation (Table 1) and designed to produce a casting free from gating defects and shrinkage. The iron was melted in a 54-in. dia., hot-blast acid-lined cupola used for production, transferred to a holding ladle, tapped from the holding ladle into preheated ladles and then poured into the moulds. The iron employed had a carbon equivalent (C.E. value) of from about 3.6 to 4.0 per cent. Effective inoculation was obtained with ferro-silicon containing appreciable amounts of aluminium and calcium, and aluminium metal added with ferro-silicon. Pure silicon was not an effective inoculant, it was found.

Fourteen groups of test castings were produced in both greensand and core-sand moulds with various amounts of inoculants under controlled conditions. All the moulds were made on a jolt/squeeze moulding machine under equivalent conditions and were compacted in slip flasks and jacketed for pouring. Mould hardness on the greensand moulds was maintained approximately constant and the sand utilized for these moulds was the regular system-sand employed in the production foundry. Results of standard AFS tests on this system-sand during this period and the composition of the sands used are given in Table 2. The base sand for the system and for cores was a sub-angular Michigan lake-sand with an AFS grain-refineness number of 50 to 53 and a 3—$\frac{1}{2}$ screen distribution. The pouring temperatures used, metal composition, its C.E. value and amount and type of inoculant are listed in Table 3. The reported compositions of the pure silicon and ferro-silicon used is:—Pure silicon-Si 98.95, Al 0.09, Ca 0.01 and Fe 0.54 per cent.; ferro-silicon-Si 84.60, Al 1.80, Ca 0.30 and balance Fe.

Results

The results of measuring the weight and volume of the 2-in. sq. castings established that the increased size of the shrinkage void that occurs in feeder-heads with inoculation can be attributed to an increase in mould-cavity expansion. The amount of increase in mould-cavity enlargement depends upon the rigidity of the mould as well as the amount of inoculation. Consequently, the increase in the movement of the mould-wall is much greater in the weaker greensand mould than the

TABLE 1.—*Pouring Times, Feeder and Gating-system Dimensions (inches).*

	Casting number.	
	1	2
Casting size	2×2×12	1.2 D×12
Pouring time, sec.	11	3.23
Head diameter and height	$2\frac{1}{2}\times2\frac{1}{2}$	$1\frac{1}{4}\times1\frac{1}{4}$
Neck diameter and length	$1\times\frac{1}{2}$	$\frac{1}{2}\times\frac{1}{4}$
Bottom diameter of sprue	$\frac{1}{2}$	$\frac{3}{8}$
Top diameter of sprue	$\frac{1}{2}$	$\frac{1}{3}$
Sprue height	6	3
Runner section	1×1	$\frac{1}{2}\times\frac{1}{2}$
Ingate diameter and height	2×2	2×2

* Progress Report sponsored by the Gray Iron Division of the American Foundrymen's Society. Of the Authors, Mr. Merchant is on the research staff and Mr. Wallace is an associate professor at the Case Institute of Technology, Cleveland.

† "Risering" is the term favoured in America to cover provision for introducing feed metal to a casting. To prevent confusion among UK readers, throughout the text of this abstract the term has been changed to feeding—Editor.

American Foundry Technology

stronger core-sand. If the movement of the mould wall is measured by the volume or weight of an unfed casting, the effects of sprue feeding, sinks and internal shrinkage can produce misleading results. Consequently, in this work, conclusions are based on the 2-in. sq. bar castings only after the feeder-heads were removed. The amount of volumetric enlargement of the mould cavity can

TABLE 2.—*Composition and Properties of Greensand and Core-sand used for Moulding the Test Castings.*

Composition, per cent. by weight.		Properties.	
Green Facing Sand			
System heap sand	82.25	Green-compression str., lb. per sq. in.	12.5
Lake sand	7.20	Permeability	115
Added coal-dust	0.56	Rammed hardness in mould	85
Added Western bentonite	1.52	Total moisture, per cent.	4.0
Added hard-wood flour	1.16	Total clay, per cent.	5.0
Added pitch	0.06	Total combustibles, per cent.	8.5
Added cereal	0.25		
Core-sand			
New lake sand	74.92	Green-compression str., lb. per sq. in.	1.0
Reclaimed sand	11.86	Baked tensile str., lb. per sq. in.	280
Bank sand	6.87	Baked scratch-hardness	95
Cereal	0.75	Baked permeability	128
Iron oxide	1.87	Green moisture, per cent.	2.5
Kerosene	0.26	Baking time, min.	80
Fast-baking oil	0.97	Baking temperature deg.C.	218
Water	1.56		
Hard-wood flour	0.94		

attain values of up to 10 per cent., or can be less than 1 per cent. in some cases, depending upon metal and mould variables.

Conclusions

Increased shrinkage and feeder requirements of inoculated hypoeutectic grey iron, compared to non-inoculated grey iron, when poured into green-sand moulds are caused by greater movement of the mould wall, the increase in the movement of the mould wall becoming larger with increasing

TABLE 3.—*Casting Data for First Series of Tests.*

Group No.	Pouring temp., deg. C.	Composition, per cent.* C.	Composition, per cent.* Si.	C.E., per cent.	Type of inoculant.	Si in inoculant, per cent.
1	1,360	3.17	1.35	3.64	None	—
2	1,415	3.08	1.41	3.57	None	—
3	1,393	3.10	1.56	3.64	Si	0.15
4	1,393	3.08	1.68	3.66	FeSi	0.15
5	1,385	3.10	1.65	3.67	Si	0.30
6	1,385	3.17	1.61	3.73	FeSi	0.30
7	1,382	3.15	1.68	3.73	Si	0.45
8	1,382	3.19	1.81	3.81	FeSi	0.45
9	1,377	3.13	1.90	3.78	Si	0.60
10	1,377	3.10	2.31	3.89	FeSi	0.60

* The entire series contained 0·70 per cent. Mn, 0·035 per cent. S, and 0·067 per cent. P.

amounts of inoculants. The amount of this enlargement is much greater than can be accounted for because of the increase in carbon equivalent and amount of eutectic graphite accompanying inoculation. A baked core (dry-sand) mould is sufficiently rigid to restrict greatly, or eliminate, any increase in movement of mould wall, resulting from inoculation. The Authors conclude that inoculation increases the movement of the mould wall by causing a more-mushy type of solidification combined with a smaller eutectic-cell size. This combination produces a greater eutectic-graphite "push" against a casting wall that is weaker for long periods, thereby causing further outward movement of the sides of the casting.

Wage Payments in the US Foundry Industry*

By M. T. Sell

The Industrial Engineering and Cost Committee of the American Foundrymen's Society undertook a survey concerning wage incentives, industrial engineering and costs. Questionnaires were sent to all AFS member foundries and the results cover types of wage-payment, premium earnings, indirect-labour operations, control methods and various other items.

In order to analyse the replies to questionnaires, they were first divided into groups according to the number of employees, which also indicated the size of the plant. Replies were divided into five groups with 0 to 50, 51 to 100, 101 to 200, 201 to 300 and over 300 employees. These groups were further analysed to determine the number of foundries within each group which classed themselves as mechanized, semi-mechanized, "production," manual, jobbing or "captive" foundries. Out of 377 responses, 103 were reported to be from mechanized foundries, 194 from semi-mechanized, 105 from "production," 74 from manual, 218 from jobbing and 115 from captive foundries (the apparent increase in total being explained presumably by overlapping in classification).

General Comparisons

Comparing the type of wage payment with the type of operation indicated that the day-work shop still prevailed in the foundry industry, with the largest percentage appearing in the largest group of over 300 employees. The percentage of plants operating on a piecework basis varied little within the groups, with the exception of the 101 to 200-employee group, which indicated 8 to 10 per cent. higher. The "wage-incentive" type of operation had its greatest use in the 51 to 100-employee group. The profit-sharing type of wage payment could be found in all categories, with the highest percentage in the 0 to 50 employee group.

Non-ferrous Foundries

Since quite a large number of replies to the questionnaires were received from non-ferrous foundries, a graph was drawn to indicate the type of wage payments prevailing in the various groups. From this it was clear that piecework and incentives prevail. Measured day-work and profit-

*Abstract of a paper presented to the American Foundrymen's Society. The Author is industrial engineer attached to the Sterling Foundry Company, Wellington, Ohio.

sharing schemes would appear to be not too popular in non-ferrous foundries. The question of whether to employ outside consultants to instal

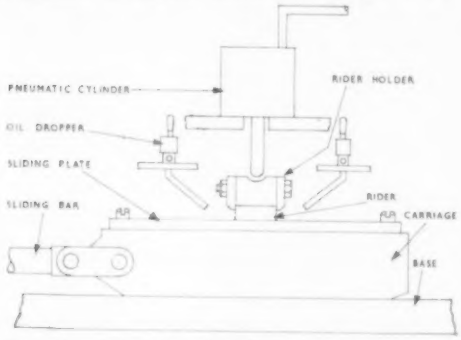

FIG. 2.—*Schematic drawing of wear machine.*

an incentive system, or to use company personnel indicated that about 40 per cent. of all foundries use outside consultants.

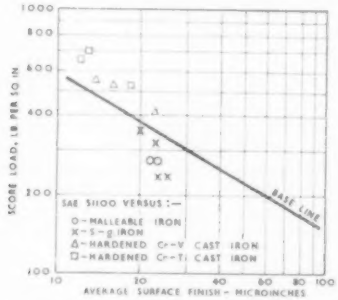

FIG. 3.—*Score loads for iron riders on SAE* 51100 (*Rockwell c* 60) *steel plates. Hardness-malleable—Rockwell b* 55-80; *S.-g. iron—Rockwell b* 60-80; *Cr-V—Rockwell c* 53-55 ; *Cr-Ti—Rockwell c* 56-59. *Base line—SAE* 51100, *Rockwell c hardness.*

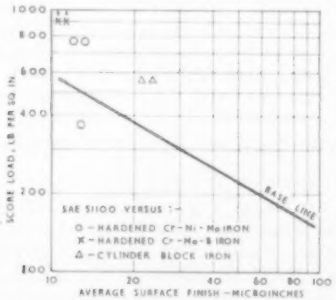

FIG. 4.—*Score loads for iron riders on SAE* 51100 (*Rockwell c* 60) *steel plates. Hardness—Cr-Ni-Mo —Rockwell c* 53-55 ; *Cr-Mo-B—Rockwell c* 52-55 ; *Cylinder Block—Rockwell b* 96. *Base line—SAE* 51100 *versus SAE* 51100, *Rockwell c* 60 *hardness.*

Premium Payment and Indirect Labour

Premium-payment plans are used to the greatest extent—over 75 per cent.—in the largest plants. Breaking employee-coverage down still further, the Author showed that coremaking and moulding have the greatest coverage among the direct-labour jobs. The indirect-labour operations of pouring, melting, and shakeout average about 40 per cent. coverage, with the larger plants having the most coverage. Most premium-payment plans seem to make it possible for the direct worker to attain an average performance of 125 to 130 per cent., and the indirect worker an average performance of 115 to 120 per cent.

The Author concludes that industrial engineering supervision should include time-studies, development of standard data, work simplification, job evaluation and estimating, timekeeping, payrolling, cost analysis, pricing, production control, quality control, pattern design, plant layout, material specifications, methods improvement, and labour analysis. (The data collected in the survey are tabulated in chart form in the original publication.)

Materials for Automobile-engines Tested for Metal Wear*

By J. H. Olson and R. D. Chapman

Scoring wear is often a difficult problem encountered in the manufacture of automobile engines, for even well-lubricated surfaces require score-resistance to prevent damage or possible seizure during starting and stopping or periods of overload.

In this investigation, various ferrous/ferrous and ferrous/non-ferrous pairs of flat wear-samples, lubricated and in reciprocating motion, were progressively loaded until they scored. The machine shown in Fig. 2 was constructed to study scoring on flat lubricated surfaces in reciprocating motion. Rider samples 1 by ½ by ½ or ½ by ½ by ¼ in., bevel ground to an angle of 15 deg. by a standard procedure on the leading edges, were forced against a 7 by ½ by ¼-in. plate. The steel plate was driven back and forth (19 ft. per sec. max. speed) over a 4-in. stroke in a pressure-lubricated steel track. Oil at the rate of one drop per sec. was dropped on to the plate on each side of the stationary rider to provide an excess of oil. Temperature was measured by a thermocouple connected to a high-speed recorder and percussion-welded to the rider just above the wear surface. A time/temperature plot for two surface-finish conditions showed that the beginning of scoring occurred with a sudden rise in temperature. A fine finish for steel was able to withstand a greater load without surface damage.

Tests on cast iron carried out on the reciprocating wear-machine confirmed the prevailing opinion

* Abstract of paper presented at the American Society of Metals Convention held last year in Philadelphia. The Authors are senior research scientist and assistant chief engineer respectively of the Basic Sciences Research, Chrysler Corporation, Detroit, Michigan.

TABLE. 4—*Casting Materials Tested.*

Material.	Per cent. composition.								
	C.	Mn.	P.	S.	Si.	Cr.	Ni.	Mo.	Others.
SAE 51100	0.95	0.35	0.024	0.015	0.25	1.00	—	—	—
•Piston-ring cast iron ..	3.7	0.60	0.50	0.10 max.	2.8	—	—	—	—
•Cylinder-block cast iron ..	3.3	0.70	0.15 max.	0.13 max.	2.0	—	—	—	—
Malleable iron	2.50	0.46	0.088	0.130	1.60	—	—	—	—
Nodular iron	3.65	0.68	0.091	—	2.28	—	—	—	—
†Cr—V cast iron	3.22	1.40	0.142	0.114	2.11	0.48	—	—	0.16 V
†Cr—Ti cast iron	2.55	1.23	0.117	0.116	1.80	0.53	—	—	0.5 Ti
†Cr—Ni—Mo cast iron ..	2.95	1.03	0.095	0.110	3.80	0.35	0.15	0.20	—
†Cr—Mo—B cast iron ..	3.40	1.19	0.072	0.100	2.32	0.41	0.08	—	0.1 B
•Armco iron	0.11	0.01	—	—	—	0.01	—	—	—
•SAE 1017	0.18	0.42	0.026	0.020	—	—	—	—	—
•Hadfield Mn steel	1.2	14.0	—	—	—	—	—	—	—
• Nominal composition. ..									

Thermal treatments.

SAE 51100 .. .. Stress relieved 2 hr. at 675 deg. C. Furnace cool, 45 min. at 800 deg. C. Oil quenched Rockwell 63, 1 hr. 195 deg. C. Rockwell 60.

†Alloy cast irons .. Oil quenched from 845 deg. C.

that smooth surfaces (in the case of cast iron) were undesirable for high score-resistance in cylinder bores. Wear resistance is often considered to be roughly proportional to hardness and this was shown to be valid for various cast-iron samples (Figs. 3 and 4). In Fig. 3, the score-resistance is higher for the hardened cast irons as compared with the softer malleable and s.-g. irons, when run against a hardened SAE 51100 steel. Among the hardened cast irons, those with boron although equivalent in hardness to the others, attained high loads without scoring. (This was attributed to a wear-resistant carbide containing boron. Many factors besides hardness affect the wear of cast iron, especially the size and type of graphite. The "production" cylinder-block iron which was low in hardness had good score-resistance. Cast iron "versus" cast iron did not show the relationship between finish and hardness observed for the hardened steels (Fig. 5). The data in Fig. 5 show higher score-resistance for cast iron at a finish of 10 to 20 micro-inches than at either a smoother finish or coarser finish. All score loads were higher than would be expected for steel "versus" steel at the same low hardness.

Dealing with non-ferrous samples, it was found that running a 20 per cent. Si/aluminium-alloy on hardened SAE 51100 gave exceptionally high score-resistance, and running pure aluminium on SAE 51100 showed the score-resistance to be inferior to the hardened steel "versus" hardened steel.

Anodized riders tested on anodized plates scored at low loads with severe damage, but "Alodized"* riders of the same alloy, and riders treated by various methods to form oxide coatings ranging in thickness from 0.0003 to 0.002 in., did not score at loads as high as 735-lb. per sq. in. when tested against SAE 51100 and cast iron. It is believed that this effect was caused primarily by the high thermal-conductivity of the aluminium which prevented breakdown of the oil film.

Cast-iron piston ring "versus" cylinder-block type at a finish of 10 to 20 micro-inches behaved traditionally well. For two hardened-steel surfaces, the score resistance increased hyperbolically as the average finish improved from 60 to 3 micro-inches. The Authors conclude by stating that high score-loads can be attained and score damage minimized by utilizing an aluminium-base, rather than steel, under hard-plated surfaces to enhance thermal conductivity and prevent loss of the oil film.

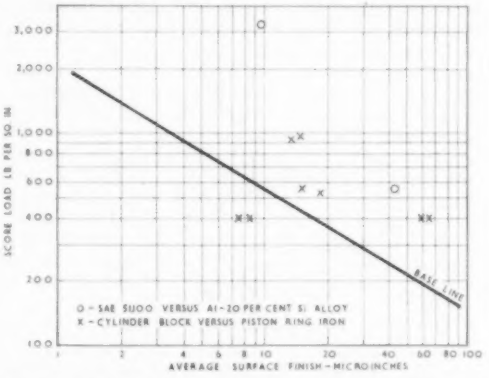

FIG. 5.—*Score loads for cast iron against cast iron and an aluminium-silicon alloy against SAE* 51100 *steel. Base line—SAE* 51100 *versus SAE* 51100 *Rockwell c* 60 *hardness.*

Machinability of S.-g. Cast Irons*

By I. Ham, K. Hitomi, and G. L. Thuering

Three grades of s.-g. iron (60, 80 and 100) were tested to determine the cutting and feed forces required to machine the materials, to determine the performance of several grades of carbide and

* Trade name for oxide film formed by chemical-dip process.

* Abstract of paper contributed by the Production Engineering Division for presentation at the Production Engineering Conference, Milwaukess, Wisconsin, convened last year by the American Society of Mechanical Engineers. The Authors are assistant professor, graduate assistant and professor respectively of the Department of Industrial Engineering, Pennsylvania State University.

oxide cutting tools, and to investigate the flank-adhesion phenomenon.

Earlier tests carried out indicate that s.-g. iron, depending on its strength, has tool-life values corresponding to, or exceeding, those for grey cast-iron of considerably less tensile strength, and

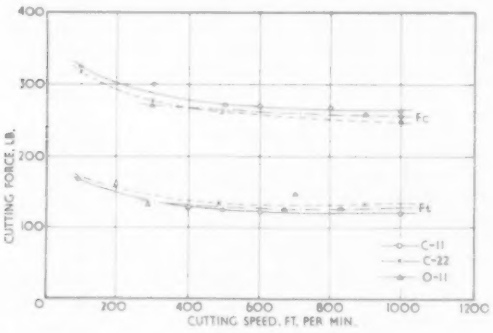

FIG. 6.—*Effect of cutting speed on cutting force and feed force on nodular cast iron* 80-60-03 *with carbides C-11 and C-22 and oxide O-11. Cutting conditions—depth of cut* 0.100 *in., feed* 0.010-*in. per revolution; dry. Fc=tangential cutting force: Ft=feed force.*

that tool-life for machining s.-g. iron is about equal to that for machining cast steels of similar hardness. The composition, Brinell hardness and heat-treatment of the three grades investigated are given in Table 5.

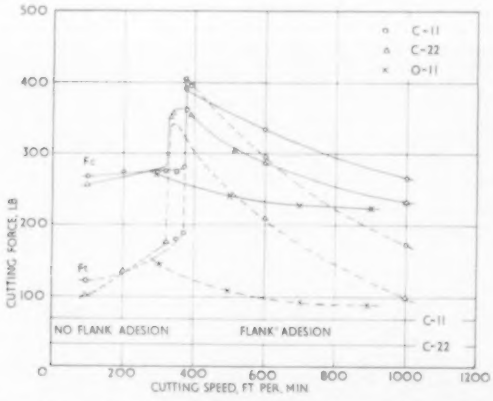

FIG. 7.—*Effect of cutting speed on cutting force for nodular cast iron* 60-45-10 *with carbides C-11 and C-22 and O-11. Cutting conditions—depth of cut* 0.100 *in., feed* 0.010 *in. per revolution; dry Fc=tangential cutting force; Ft=feed force.*

Details of Tests

The tests were run on billets 19-in. long and 6½-in. dia. with a cored hole of 3-in. dia. The billets were poured from standard-production melts

TABLE 5.—*Composition, Hardness, and Heat-treatment of Nodular Cast Iron.*

Description.	Grade.		
	60–45–10	80–60–03	100–70–03
Composition:			
Graphitic carbon ..	3.02	3.06	2.66
Combined carbon ..	0.16	0.46	0.70
Total carbon ..	3.18	3.52	3.36
Silicon	2.34	2.23	2.35
Manganese	0.33	0.40	0.84
Phosphorus	0.040	0.059	0.058
Sulphur	0.019	0.022	0.018
Copper	0.06	0.08	0.44
Nickel	0.04	0.42	0.05
Chromium	0.02	0.03	0.03
Molybdenum	0.03	0.09	0.01
Vanadium	0.01	0.01	0.01
Magnesium	0.036	0.033	0.059
Brinell hardness:			
Range	145 to 156	204 to 232	229 to 248
Mean	150	214	237
Heat-treatment	885 deg. C. for 2 hr., furnace cooled	885 deg. C. for 2 hr., air cooled 540 deg. C. for 4 hr., furnace cooled	540 deg. C. for 2 hr., furnace cooled

and subjected to standard-production heat-treatment. Brinell hardness readings were taken at intervals along the length of the billets after they had been machined to remove the as-cast surface, and a flat was milled the length of the billets for Brinell indentations. All the tests were run dry. Because of the flank-adhesion which developed when cutting grade-60 nodular cast iron with carbides, additional tests were conducted in the speed range at which build-up occurred. These tests were run at speed increments of 25-ft. per min., a new cutting edge being used for each test. Typical hardness and composition of the carbide and oxide inserts are given in Table 6.

Tests on grade 100 s.-g. cast iron were run with two grades of carbide, C-11 and C-22, and two grades of oxide, 0-11 and 0-22. In general the forces were slightly higher than for high-strength grey cast irons under the same cutting conditions. The effect of difference in cutting-tool materials for this type of s.-g. cast iron is negligible. The type of chip and other cutting charateristics for grade 80 and 100 s.-g. cast iron, except for tool-life values, were the same as for high-strength grey cast irons with similar Bhn values, but lower

TABLE 6.—*Chemical Composition and Properties of Cutting Tools.*

Tool.	Density, g. per cm³.	Hardness (R_A).	Composition (per cent by weight).					
Carbide No.			W	Co	Ti	Ta	Nb	C
C-11	14.9	92.0	86.4	5.75	—	2.0	—	5.8
C-22	12.4	92.0	72.6	6.75	4.7	3.4	5.8	6.9
Carbide No.			W	Co	TiC	TaC		
C-55	11.98	92.2	70.7	4.5	12.6	12.2		
C-66	14.95	92.0	94.0	6.0	—	—		
Ceramic No.	Sp. Gr.		Major ingredient					
0-11	—	92.1	Aluminium oxide					
0-22	3.95	92.0	Aluminium oxide					

tensile-strength value. Other investigators have reported that when the Bhn values are the same, s.-g. cast iron has better machining characteristics than grey cast iron in respect to life.

Grade 80-60-03 s.-g. iron exhibited a force pattern similar to that for grade 100-70-03 (Fig. 6). The forces are 5 to 10 per cent. lower, however, than those for grade 100, and the force values for grade 80 were about the same as those for high-strength grey irons.

Flank Build-up

When grade 60 s.-g. iron is cut with carbides, the tool forces show an unusual variation with changes in cutting speed and carbide-tool material. All carbide tools tested on grade 60 s.-g. iron exhibited flank build-up at medium and high-speed ranges and cutting-edge build-up at low speeds. On the other hand, oxide tools (both 0-11 and 0.22) did not show any flank build-up throughout the speed range tested (see Fig. 7).

Flank build-up differs from the familiar built-up edge which occurs on the face of a tool, in that it occurs on the flank at a certain critical cutting-speed, grows rapidly, and flows out between the flank of the tool and the work material in the form of a ribbon. In general, cutting and feed forces increase suddenly at a certain critical speed as flank build-up develops, and continue to increase up to maximum point, gradually decreasing as cutting speed increases, the speed at which this occurs depending on the composition of the cutting tool. Below the speed at which flank build-up occurs, the cutting temperatures are too low for welding (flank adhesion) and not high enough to produce a significant amount of oxide film. A chemical analysis of the flank build-up showed the following: Graphitic carbon 1.15; combined carbon 1.18, total carbon 2.33, manganese 0.31 and phosphorus 0.040 per cent.

Comparison with the analysis of the work material (Table 5) shows that there is less total carbon in the build-up and a large increase (0.16 to 1.18 per cent.) in combined carbon. This increase can be attributed to high temperatures in the area of the formation of the build-up.

Flank build-up remains the same or grows with increases in speed when grade 60 s.-g. iron is machined with straight tungsten-carbide tools, and the occurrence of flank build-up is definitely related to tool composition and cutting speed. Tools which contain titanium or TiC exhibited less tendency to form flank build-up, hence the lower tool forces than with tools without titanium. Tantalum also seems to inhibit flank build-up, but does not appear to be as effective as titanium.

Conclusions

Flank build-up does not occur when grade 60 s.-g. iron is machined with oxide tools, and flank adhesion, with accompanying sharp increases in cutting-force values, was encountered only when grade 60 was machined with carbide tools. Nodular cast irons, grades 80 and 100, machine in a manner similar to high-strength grey cast iron and the cutting forces and net horsepower required for machining grade 80 are approximately 5 per cent. less and for grade 60, 10 per cent. less, than the force for grade 100 (Fig. 6).

Publications Received

Fire-fighting in Factories. Published for the Ministry of Labour by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 2s. net.

Essentially this is a guide to the requirements of section 12 (1) of the Factories Act, 1959, but it is also a veritable textbook on the subject and the compiler is to be congratulated on the way he has made the principles of combustion easily understandable. As a young man, the reviewer received the commendation of a fire-brigade on the extinguishing of a transformer-oil fire by throwing in quantities of firebrick to reduce the temperature below ignition point. Through the application of such elementary science, the book points the way to the dealing with fires emanating from a multitude of sources. With this knowledge, those responsible for the safety of factory buildings can much better collaborate with the Factory Inspectorate and the local fire-brigade in the provision of adequate equipment and its maintenance. Foundry managers would do well to procure this pamphlet as some of the materials now being used in foundries carry special fire hazards.

Accidents—How they happen and how to prevent them. Published for the Ministry of Labour by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. 3d. net (say about 1s. 6d. post free).

There are a number of interesting cases reported in this issue. One of particular interest to foundry owners is that concerning a fatal accident which occurred when the machinery was suddenly started up during the repair of a sand mill. Another case recorded relates to the misuse of a pulley-block. Fortunately the men were able to jump clear, but the incident carries a lesson well worth studying. This type of note with its simple illustration is that most acceptable to persons really interested in accident prevention as they do not need horrifying pictures to stress inherent dangers.

Alloys VL55 and VL55 (M) in the Production of S.-g. Iron. Issued by Union Carbide, Limited, 8, Grafton Street, London, W.1.

Alloys VL55 and VL55 (M) are essentially magnesium/calcium/silicon alloys (though the latter also contains cerium), designed to give a controlled solution of magnesium to produce spheroidal-graphite iron. The brochure covers application of the alloys, their chemical composition and necessary equipment for their use. Good diagrams of ladle practice are also included.

Machining Wiggin High-nickel Alloys. Published by Henry Wiggin & Company, Limited, Wiggin Street, Birmingham, 16.

These alloys carry a combination of high strength and ductility, characteristics which involve machining procedures different from those associated with alloy metals having lower mechanical properties. The brochure covers the whole gamut of such operations in considerable detail and it is stated that a film on the subject is also available.

Vanderbijl Engineering Corporation's Foundries

premises visited by Members of the IBF South African Branch.

Classified as "heavy mechanical engineers and founders," the Vanderbijl Engineering Corporation supplies heavy machinery for the mining, steel, cement, lime, chemical and metallurgical industries of South Africa. As such it ranks among the most important foundries of the Southern Hemisphere.

The Vanderbijl Engineering Corporation's foundry, established in 1948, has a total floor-area of 95,000 sq. ft.; crane capacity in the heavy bay being one 65-ton and two 35-ton cranes. Castings are produced of up to 50 tons cast weight in steel, in cast iron up to a maximum of 50 tons cast weight, and in non-ferrous metals up to 27 cwt.

Moulding

For steel and iron castings, cement sand is extensively used for moulds and cores, using as a standard a mixture of nine parts sand, one part cement and seven to nine per cent. water—although the mixture may be modified to suit particular requirements. The standard mix gives a green-compression strength of 1.5 to 2 lb. per sq. in. and permeability of 80 to 100. After air drying, the results are: permeability, 110 and dry-shear, 25 to 30 lb. per sq. in.

Cement sand is mixed in a Beardsley and Piper batch-mill of 350 lb. capcity and output of 8 to 10 tons per hour. All other sand for iron and steel moulding is mixed in two "Speedmullers" rated at 20 tons per hour. In the non-ferrous foundry, a Richards mill caters for the dry- and greensand-requirements.

Most of the large moulds, produced in boxes up to 17-ft. 6-in. sq., have the drag halves set in the floor as can be seen from the accompanying Fig. 1. Two "B.M.D." mobile 'slingers, with sand-hoppers attached, travel the length of the foundry to ram the various moulds, these slingers having an output of 40 tons per hour each. Pneumatic rammers and jolt/roll-over matchines are used for small moulds in the lighter section of the foundry.

Drying

Large moulds are dried using movable electric

FIG. 1.—*Section of jobbing-foundry floor at Vanderbijl Engineering Corporation, South Africa. A slag-ladle core is shown in the lower right-hand corner.*

FIG. 2.—*Mobile 'slinger (top, left) and movable electric mould-dryer (right) in the Corporation's heavy foundry. Castings are here produced in iron and steel of up to 50 tons.*

FIG. 3.—*Vanderbijl's 30-ton Efco electric furnace ready for its first tap. This is the latest melting equipment acquired by the foundry and as in the case of the other two smaller electric furnaces the unit is also acid-lined.*

dryers of the type shown in Fig. 2. Three coal-fired drying ovens are also used for moulds, three of the same type are employed for cores and in the non-ferrous foundry for core-drying there are three electric ovens equipped with air-circulating fans.

Melting

The most recent addition to the Vanderbijl melting shop is an Efco furnace having a nominal capacity of 30 tons. This unit is illustrated at Fig. 3. Two Birlec furnaces are also used for iron and steel melting, having capacities of 1¼ and 10 tons. All three electric furnaces are acid lined. For iron melting, two Whiting cupolas are installed, one of 36 in. dia., producing 5 tons per hour, the other 54 in. dia., having an output of 11 to 12 tons per hour. The cupolas also are acid lined, and are of the front-slagging and continuous-pouring types, delivering metal into receivers for holding until required.

The non-ferrous foundry has an output of 40 to 50 tons of castings per month and a variety of melting units are used. For example, there are two 600-lb. Selas oil-fired tilting furnaces, a 300-lb. Morgan tilting furnace (also oil-fired) and two Birlec rocking-arc furnaces each having a capacity of 1,200 lb. (The electric furnaces are shown in the background of Fig. 4.)

Fettling

The fettling shop measures 450 by 80 ft. and is so equipped as comfortably to handle the foundry output. A 10-ton and 35-ton crane will take the

FIG. 4.—*Part of non-ferrous foundry floor; the furnaces, including rocking-arc units, are shown in the background.*

bulk of the work, and strategically-placed wall-cranes take care of localized operations. Oxy-acetylene torch-cutting is used for feeder-head removal, swing-frame and portable grinders are employed for finishing operations and a Tilghman's shot-blast cabinet is available for cleaning small and medium-size castings. There are several annealing units, the most modern being a Birlec electric oven with a bogie size of 14 by 20 ft.

Patternshop

Strickles, skeleton-type and full patterns are made in the Corporation's patternshop which smploys 15 patternmakers and eight apprentices. Malayan Jelatong timber is widely used. The usual types of woodwork-ing machines are installed, including a Wadkin pattern miller and a high-speed router of the same make. The patternshop covers 12,375 sq. ft., has its own tool-store and tool-sharpening facilities.

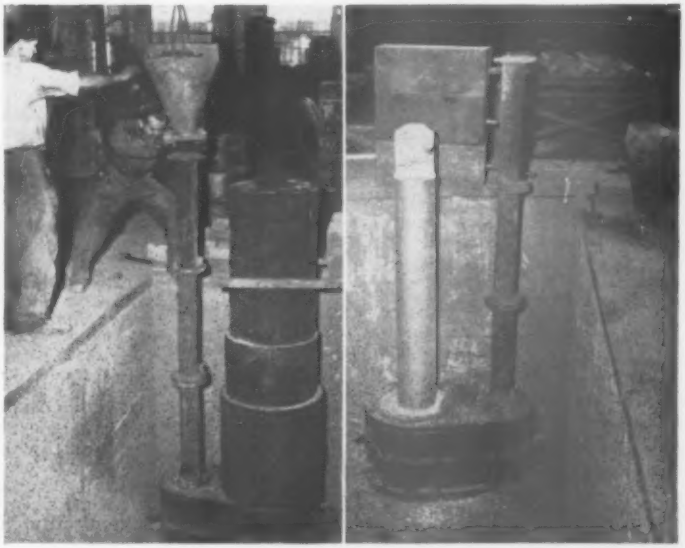

FIG. 5 (*left*).—*Setting the runner components of a mould for a spheroidal-graphite iron roll casting and, Fig.* 6 (*right*), *casting produced from the mould; note the clean strip obtained.*

Vanderbijl Foundry Visit

Inspection and Testing

Fully-equipped "wet" and "dry" laboratories are attached to the foundry division for routine sand testing, chemical and metallurgical inspection and control. A Fuess spectroscope is employed for the determination of the magnesium content in spheroidal-graphite iron. There is also a Vickers projection microscope in constant use and, in the sand-testing division, a Dietert dilatometer is used for checking the "hot strength" and "spalling" characteristics of the core and moulding sands.

"On-the-spot" checks of castings are made using radio isotope units and ultrasonic testing and radiographic checks can also be made by means of a 1,000,000 kva X-ray machine.

Products

The steel foundry has an output of 500 tons of castings per month, ranging from a few pounds in weight to a bloom-shear casting—the heaviest made to date—weighing just over 41 tons. Slag ladles account for constant proportion of the tonnage, as 8 to 10 are made every month, for the local steel-works and the copper mines in the Central African Federation. Girth gear-rings, made in halves, up to 18-ft. dia., are made for rotary lime-kilns and copper converters.

The company was one of the first manufacturers of s.-g., iron in South Africa, having received a licence in 1950. Their principal products in this field are mill rolls of which they make 800 tons annually. This is 30 per cent. of the demand from local steel mills and 5 per cent. of the demand for other industries. A roll mould and a cast roll are shown in Figs. 5 and 6, respectively. The total output of other iron castings produced is 1,600 tons per month.

Large tonnages of Ni-hard shell-liners are supplied for cement mills. Copper tuyeres, ranging from 16 to 750-lb. weight are made in the non-ferrous foundry, sometimes as many as 170 being produced in one month. Specially-designed moulding boxes are used for this casting and some may be seen in the right foreground of Fig. 4—a dry-sand core for a tuyere is also shown in the foreground of this illustration. Bushes, up to 8¼ in. o.d. are centrifugally cast in the non-ferrous foundry, which has a monthly output of 45 to 50 tons of castings.

There are 66 moulders in the foundry, controlled by an administrative staff of seven; the laboratory has a staff of eight technicians.

Acknowledgment

Thanks are recorded to the Vanderbijl Engineering Corporation, Limited, for permission to publish these details of their plant and operations and for supplying the illustrations.

Mr. D. H. FISHER has resigned as production and technical director of Magnavox Electronics, Limited.

Prizegiving at Poplar

The annual distribution of prizes and certificates of the Poplar Technical College was held on Thursday, February 23, with Mr. Stewart Hogg, O.B.E., M.I.MECH.E. (chairman of the Governors), in the chair. Before the awards were made, Mr. P. J. Howard, B.SC., (ENG.) HONS., A.C.G.I., M.I.MECH.E., principal of the College, gave his annual report which was received with enthusiasm. Next came the distribution of awards by the Rt. Hon. the Viscount Simon, C.M.G., president of the Institute of Marine Engineers, following which he addressed the students. At the close of the formal proceedings, the laboratories and workshops of the College were open for inspection and a gymnastic display was given by the boys of the Secondary Technical School.

Examining the results in more detail, the pass results were far above average, *e.g.*, in the Extra First-class (Marine) Certificate, out of 15 awards made throughout the whole of the UK and Commonwealth, eight were obtained by students of Poplar Technical College. From the foundry angle in particular, it was interesting to note that there were no fewer than seven students who obtained first-class passes at advanced level in the City & Guilds "final" in Foundry Practice, and a similar high number of successful students in the same category for pattern-making. One student in the Foundry Class (Mr. B. Rowbury) had obtained the Silver Medal awarded by the City & Guilds and also the Buchanan Silver Medal awarded by the Institute of British Foundrymen. For these truly excellent achievements, great credit must go to the principal, masters and tutors of the College. City & Guilds of London Institute certificates in Foundry Practice (Advanced) were awarded to Mr. J. W. J. Bugg, Mr. B. Rowbury, Mr. M. J. Walsh, Mr. N. S. Washbourn, Mr. E. R. Y. White, and at "Ordinary" level to Mr. N. J. Allen, Mr. C. R. Andrews, Mr. A. J. Carpenter, Mr. J. E. Gordon, Mr. J. Long, Mr. C. M. Maher, Mr. D. Masterton, Mr. A. R. Newman, Mr J. C. O'Leary and Mr. J. T. Pearson. Certificates for (Advanced) Patternmaking were presented to Mr. J. D. Cook, Mr. R. W. Marriott, Mr. D. W. Sawyer, and Mr. J. H. Webster, and at "Ordinary" level to Mr. M. D. Block, Mr. R. M. Bolter, Mr. V. Cordwell, Mr. D. G. Drayson, Mr. A. F. French, Mr. B. J. Hawkins, Mr. N. King, Mr. I. J. Klatcheff and Mr. C. A. Sage.

Institute of Vitreous Enamellers

The Northern section of the Institute of Vitreous Enamellers is holding a meeting this evening (Thursday) commencing at 7.30 p.m., at the Old Nag's Head, Jackson's Row, Manchester 2. The speaker will be Mr. S. E. A. Ryer who will be talking about his recent experiences in Russia. The next meeting, on April 20, will be a symposium on "Enamelling Practices" the main speakers being Mr. Semple, Mr. Ward and Mr. Birchall. The Institute is proposing to hold a golf tournament during the year, and the secretary, Mr. O. Dreyer, 15, Albemarle Avenue, Withington, Manchester 20, would be pleased to hear from members as to when they would like this event to take place.

OZD STEELWORKS, in Hungary, whose capacity has recently been increased to 600,000 *tonnes* of raw steel annually, is undergoing reconstruction. By mid-1962 eight oil furnaces equipped with electronic measuring instruments will replace the 12 existing furnaces each with a capacity of 60 *tonnes*. Steel production will eventually increase to 800,000 *tonnes*.

Notes from the Branches

London

At the January meeting of the London branch of the Institute of British Foundrymen with Mr. D. A. C. Hutchison in the chair, Mr. F. Hudson, F.I.M., presented a paper entitled "Developments in the Production of Gunmetal Castings,"* to an audience of about 90 members and guests.

Mr. Hudson began by saying that little information was previously available on the effect of production methods on the properties of medium- and thick-section gunmetal castings. A study had now been made of this subject, however, using large tensile test-bars as shown in Fig. 1. These were 3-ft. long, 4-in. dia. in the breaking area, and weighed approximately 300 lb. each; they were cast in 90/10 zinc-free tin-bronze, 88/10/2 gunmetal, and in 87½/7½/2/3, 85/6½/3/3½/2 Ni., and 85/5/5/5 leaded-gunmetals. To get some idea of the effect of metal-mould reaction on the properties of thick-section castings, three series of these large tensile test-bars were made in each of the above alloys, and with varying residual phosphorus and mould moisture contents to obtain:—(*a*) no metal/mould reaction; (*b*) a small amount of metal/mould reaction, and (*c*) a substantial degree of metal/mould reaction.

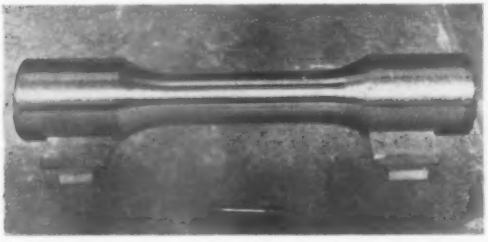

FIG. 1.—*Large gunmetal tensile test-bar (3-ft. long, 4-in. gauge dia. and weighing 300 lb.) used in the investigation, in comparison with a standard 0.564-in. dia. bar, shown in the foreground.*

Mr. Hudson reported that the results obtained indicated that metal/mould reaction had an important bearing upon the sensitivity of these alloys to variations in casting section. When metal/mould reaction was suppressed and provided the molten metal had been adequately degassed, the mechanical properties of thick-section gunmetal castings, containing more than seven per cent. tin and less than three per cent. lead, were almost equivalent to those obtained from separately-cast standard 0.564-in. dia. test-bars. In the case of alloys containing less than seven per cent. tin and more than three per cent. lead—acknowledged as being most suitable for the production of castings which have to withstand pressure—the properties of thick-section castings were well below those obtained from separately-cast test-bars even when metal/mould reaction was suppressed. This fall in properties in leaded-gunmetal, due to the weakening effect of massive grain-boundary lead segregates, could be countered by the addition of two per cent. nickel, enabling maximum strength and pressure-tightness to be obtained.

The results confirmed that an alloy containing six to seven per cent. of tin, three to five per cent. zinc, three to five per cent. lead, 1½ to 2½ per cent. of nickel, and remainder copper, was capable of producing thick-section castings having properties equal to those obtained from 88/10/2 gunmetal and with a much higher level of pressure-tightness.

Points arising in discussion included: Development of the maxim "eliminate metal/mould reaction, run and feed properly, keep metal temperature low and arrange steep cooling gradients to give sound gunmetal castings"; that exothermic sleeves could result in gas reactions below feeder-heads; that 0.005 to 0.010 per cent. residual P. should be adequate for deoxidizing; that pressure-feeding was unlikely to be of use for gunmetal because it was not a skin-forming alloy, but rod-feeding might help, by a pumping action—akin to tyre inflation; no generalizations were possible as to adoption of top or bottom pouring. The inferior zones in the centre of the heavy-section bars were attributed to gas concentration in that area; deep feeder-heads were to be preferred to shallow ones of the same volume and a rigid mould seemed to be another requirement.

* This paper has also been presented by the Author at meetings of the Scottish branch and East Anglian section of the Institute. In modified form, it forms part of a Paper by Mr Hudson to be presented at the annual conference in Cheltenham next May.

South Africa

Considerable interest in the CO_2 process was shown at the January meeting of the South African branch of the Institute of British Foundrymen, when a large gathering of members and guests attended a lecture on the subject in Johannesburg. The branch president, Mr. D. Gordon Jones, introduced the Author, Mr. R. Laycock, as one of the pioneers of the Process in South Africa as he had established CO_2 practice in a mechanized foundry shortly after its introduction into the country.

The Author commenced by urging every foundry to study the Process so that it might be used to the best advantage and give full benefits both physically and economically. He warned against using hot sand because he said it would cause evaporation of the small amount of water present in the mixture and lead to premature drying of the mix, poor bench-life and friable moulds and cores. He also stated that the sand should be dry as excess moisture extended the gassing period. Care should be taken to prevent over-heating of the sand during mixing and a time of 2½ to 4 min. was usually adequate. Any ingredients added to assist breakdown such as coal-dust, pitch, wood-flour, should be added after the sodium-silicate addition thus leaving the breakdown additions as "free agents." Mr. Laycock said that in his experience, the percentage of silicate should be varied to suit the particular job and gave the following as a guide: three per cent. for light cores, four per cent. for medium cores and five per cent. for heavy cores or moulds. He went on to say that if wood-flour was used to assist breakdown, it should be from hard woods, first, because soft woods would absorb the small amount of moisture in the mix, and cause the mix to be difficult to work; second, the soft wood swells and the possibility of scabbing would be present. The smaller the moulds and cores the smaller the size of wood particles, right down to the flour grade.

The Author then discussed gassing techniques, and dry-ice containers as related to South African conditions.

Mould Dressings

Other points made by the Author were that mould dressings for the CO_2 Process were usually the "light

Notes from the Branches—South Africa

off" type. Petrol, crude naphtha, and methylated spirits performed fairly well when mixed with blacking or other refractory coatings. Dextrine and RC2 Bitumen were suitable binders to assist the coating to adhere to the core or mould. There were proprietary blackings on the market which could be mixed with spirit; these contained their own fixing agent. He then gave details of one or two light-off mixes as follow: (1) 1 gal. methylated spirits; 4 oz. dextrine and 6 lb. blacking. (2) 1 gal. crude naphtha; 2 lb. RC2 bitumen and 6 lb. blacking. For heavy-type castings zircon flour could be substituted for blacking.

The balance of the lecture was devoted to the showing of numerous illustrations depicting a variety of moulds, cores and castings made by the Process.

At the conclusion of the lecture, the president called on Mr. R. C. Cross, past-president, to open the discussion. Mr. Cross congratulated Mr. Laycock on giving such a practical paper, and asked if there had been any change in his costs since the introduction of the CO_2 Process in his foundry. The Author replied that there was a definite downward trend in castings costs for various reasons, probably the most important being the reduction in defective castings. A lively discussion ensued and at the conclusion, the president called on Mr. J. J. Marais to propose a vote of thanks which was heartily acclaimed.

American Letter

AFS Awards

Eight outstanding foundrymen will be honoured at the 65th American Foundrymen's Society Castings Congress in May for contributions to the foundry industry and the Society. Two will receive AFS gold medals, three will be presented with awards of scientific merit, and three will be awarded service citations. Recipients of the gold medals (which will be presented at the AFS annual banquet) will be Mr. Merton C. Flemings, Jr., assistant professor of metallurgy, Massachusetts Institute of Technology, and Mr. William S. Pellini, metallurgy department, Naval Research Laboratories, Washington, D.C. Awards of Scientific Merit will be presented to Mr. Harvey E. Henderson, technical director, research department, Lynchburg Foundry Company; Mr. T. R. Schroeder, foundry superintendent, Pontiac motor division, General Motors Corporation, and Mr. Herbert J. Weber, director of the AFS Safety, Hygiene and Air Pollution Control Programme. Service citations will be presented to Mr. A. D. Barczak, operations vice-president, Superior Foundry, Inc., Cleveland; Mr. K. M. Smith, staff engineer, Caterpillar Tractor Company, Peoria, Illinois, and Mr. Jess Toth, vice-president, sales, Harry W. Dietert Company, Detroit.

* * * *

AMERICAN ZINC INSTITUTE has moved its Detroit headquarters to new and expanded facilities at 638, New Centre Building, Detroit, 2, Michigan, USA.

LYNCHBURG FOUNDRY COMPANY, Lynchburg, Virginia, is constructing a $37,550 two-storey addition to increase the capacity of its shell-moulding shop.

CONSTRUCTION of a new $1,300,000 manufacturing facility for Harvill Corporation was commenced in February in the Rancho San Pedro industrial area, near Compton, California. Scheduled for occupancy early in July, the 101,000 sq. ft. plant will increase production of die-castings and moulded-plastic products by more than a third.

Materials Handling Conference

The second international materials handling conference, to be held at the Prince of Wales Hotel, Southport, from May 10 to 12, will be formally opened by the Mayor of Southport, Councillor Lambert F. Spence, J.P. Divided into four main sections, the conference will deal with materials handling in agriculture and food production; the extractive mineral and chemical industries, and the heavy and light industries. Mr. C. Metcalfe, managing director, E.M.I. Electronics, Limited, is to give the opening address on "Materials Handling as a Co-ordinating Stimulus throughout Industry."

Papers of interest to those in the foundry industry include "Handling Raw Materials in a Heavy Industry," by H. J. Stengert (August-Thyssen-Hutte, Germany); "Handling Considerations in Building Construction," by T. McMillan (Tarmac Civil Engineering, Limited); "Handling in Motor Manufacture," by F. J. D. Shaw (Standard Motor Company, Limited), and "Transport and Distribution in Heavy Industries," by J. N. Drummond (Pickfords, Limited). The concluding address on "Standardization and Materials Handling" will be by Mr. H. St. Leger, general secretary, International Organization for Standardization.

The annual dinner of the Institute of Materials Handling is to be held on the first evening of the conference, and arrangements have also been made for visits to a number of factories in Cheshire and West Lancashire.

Hungarian Foundry Technology

The February issue of the Hungarian foundry journal, *Ontode*, contains full-length contributions by M. Cseh (on producing spheroidal-graphite cast iron) and by B. Tamas (on lowering light-metal foundry losses).

In the former article, the Author reviews and illustrates various methods of producing spheroidal-graphite iron; he states that in his opinion the most advantageous method of producing s.-g. iron is by treating the iron under pressure with magnesium. Also enumerated are the necessary measures to be taken for the prevention of faults arising from slag production during the magnesium process. The paper also includes data on the allowable contaminating elements in the raw materials used.

Mr. Tamas in his article describes examinations carried out in three plants and states that the amount of melting losses were six per cent. when casting in sand, and four per cent. when casting into permanent moulds. The author puts forward the view that metal yield can be improved by applying easily-removable feeder-heads and by developing the technology and application of the correct size of feeders.

Jones' Crane Photographic Competition

George Cohen 600 Group, Limited, announce that the first prize (250 guineas) in their Jones Crane Photographic Competition has been awarded to Mr. W. Rodber of Taunton, Somerset. The second prize of 100 guineas went to Mrs. G. Underell, London, S.W.6, and the third, 75 guineas, to Mr. B. Turpin of Stanford-le-Hope, Essex. The total amount distributed was 600 guineas as there was a fourth prize and five consolation prizes.

Australian Foundry Survey

Castings, the Australian foundry journal, carries in its October, 1960, issue information on non-ferrous sand castings and die-castings taken from a Government report entitled "Survey of Manufacturing Activity in Australia" and published by the Industries Division, Department of Trade, Canberra.*

Non-ferrous Sand Castings

The non-ferrous sand casting industry of Australia consists of about 40 firms and has an estimated labour force of about 4,000 people. The survey covered the activities of firms producing brass, bronze, gunmetal and aluminium-alloy sand castings on both a jobbing and repetition basis. For the survey, 55 firms were interviewed, firms employing 21 people and over were regarded as large, those employing from 11 to 20 as medium-size, and those with fewer than 11 employees as small. Whilst the large majority of firms consist of those employing 10 people or fewer, the 20 large firms in the industry (about 5 per cent. of the total) employ about 35 per cent. of the total labour-force. It is estimated that in the 12 months ended March 31, 1960, the value of output of this industry exceeded £A16,000,000.

Production in the non-ferrous sand casting industry is very sensitive to slight fluctuations in demand, the report continues, as users rarely order unless the products are needed at once. Hence, foundries dependent on general jobbing activity find it almost impossible to institute organized production programmes and thus, production varies greatly from month to month. Some of the firms interviewed for the survey were attempting to diversify their range of products and to develop standard or proprietary lines to give themselves some stability in production. From the reports received, it is estimated that output increased by 7 per cent. during the 12 months ended March 31, 1960, compared with that in the same period in 1959, medium-size firms showing the largest increase in production during both periods.

Employment in the section of the non-ferrous casting industry surveyed increased slightly in the year ended March 31, 1960, the total labour input (including overtime) increasing by nearly 4 per cent., comprising about 5 per cent. for the large firms, 6 per cent. for the medium-size firms and less than 1 per cent. for the small firms. Many companies considered that there was an acute shortage of moulders and other skilled operatives in the industry, but unskilled labour was readily available. In the survey, the opinion was expressed that the shortage of moulders was a deep-rooted and long-standing problem, which appeared to have been caused by the general reluctance of parents to apprentice their boys to one of the so-called "black" trades, but some incentive-payments schemes were operating and appeared to be working satisfactorily.

Most of the large and medium-size firms interviewed had investment plans. Some were moving their plants to outer suburbs over a lengthy period whilst others were installing new moulding machines, etc., and generally modernizing their foundries during the remainder of 1960.

Die-casting

Activity in the die-casting industry of Australia increased by about 10 per cent. during the year ended March 31, 1960. Continued expansion of the automobile industry was expected to provide a major outlet for producers of die-castings. The die-casting industry consists of some 150 firms, employing upwards of 3,000 persons. The survey carried out was based on information obtained from 30 firms, accounting for 50 per cent. of the employment in the industry. Of those firms interviewed, 13 employed more than 30 persons, four employed over 200, eight had 11 to 30 workpeople and nine small firms each employed up to 10 persons.

Developments in design and production techniques were leading to an increasing use of die-castings and a number of firms were installing more-modern machinery to expand both the range and size of castings, and some firms were also investigating overseas developments such as the anodizing of aluminium die-castings. It is estimated that output was at the rate of over £A8,000,000 per year and most firms interviewed expected an increase in production during the next six months.

Dealing with labour, the survey stated that employment in the Australian die-casting industry in March, 1960, was about 10 per cent. higher than in March, 1959; some firms reported that they were obliged to offer overtime in order to retain or attract skilled labour.

A number of manufacturers were reported to be expanding or to have planned expansion of their productive capacity. New buildings or extensions were envisaged, as well as new equipment and die-casting machines to increase both the output and size of zinc-base die-castings. It is estimated that the die-casting industry as a whole will spend over £A1,000,000 on expansion and new machinery.

* An extract from the survey dealing with the ferrous side of the Australian foundry industry was printed in the JOURNAL, *December* 29, 1960, page 833.

Translation Service

The availability of the following translations is announced by the Iron and Steel Institute but enquiries for the translations bearing the MT reference should be addressed to Mr. de O. Tollemache, The Old Rectory, Lewknor, Oxon, and the Pergamon item is available from the Pergamon Institute, Headington Hill Hall, Oxford.

MT 139 STUDY OF THE INFLUENCE OF DEOXIDIZING ELEMENTS ON THE KINETICS OF DESULPHURIZATION OF IRON BY MEANS OF S^{32}. Liu-Su-Chen, J. Skála, and M. Mandl. *Hutnické Listy*, 1960, *15*, No. 10, pp. 755-62.

MT 129 OCCURRENCE OF BLOWHOLES IN CASTINGS AND MEASURES FOR THEIR ELIMINATION. Ornst, J. *Slévárenství*, 1959, 7, No. 11, pp. 433-38.

PERGAMON R. 203 AUTOMATIC CONTROL OF THE SOLIDITY OF STEEL. Ravinovich, A. N. (Book) 1957, pp. 243. (£3 3s., $9.50.)

MECHANICAL RESTRAINT OF SHRINKAGE IN CASTINGS MADE IN METALLIC MOULDS. Razumov, V. N. *Lit Prosv.*, 1960, (8), pp. 36-40. Abridged translation in *Engineer's Digest*, 1960, vol. 21, (11), Nov., pp. 81-84.

Brutcher Translations

Mr. Henry Brutcher, Technical Translations, P.O. Box 157, Altadena, California, USA, has issued a subject index (the first for over four years) of available catalogue sections. It contains about 1,200 subject headings amongst which quite a number refer to translations of direct interest to foundrymen.

A NEW COMPANY, Stanton & Staveley Sales, Limited, has been incorporated to handle all sales on behalf of Stanton Ironworks Company, Limited, Staveley Iron & Chemical Company, Limited, and Sheepbridge Company, Limited. The new company will start operating on July 1.

British Blast Furnaces in the December Quarter, 1960

(These tables are published through the courtesy of the British Iron and Steel Federation.)

Derbyshire, Leicestershire, Notts, Northants, and Essex.

Name of firm.	In blast at end of the fourth quarter, 1960.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Ford Motor	—	—	1	—	1	1	1
Holwell Iron	—	—	1	—	1	1	3
Renishaw Iron	—	1	1	—	2	2	2
Sheepbridge	—	1	—	—	1	1·7	2
Stanton Ironworks: Stanton-by-Dale	—	2	3	—	5	5	5
Staveley Iron & Chemical	—	2	2	—	4	3.4	4
Stewarts and Lloyds: Corby	—	4	—	—	4	4	4
Wellingboro' Iron	—	2	—	—	2	2	3
TOTAL	—	12	8	—	20	20.1	24

Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.

Brymbo Steel Works	—	1	—	—	1	1	1
Darwen & Mostyn Iron	—	—	—	1	1	1.1	2
Lancashire Steel Manufacturing	—	2	—	1	3	3	4
Summers, John	—	2	—	—	2	1·9	2
TOTAL	—	5	—	2	7	7.0	9

North-West Coast.

Barrow Ironworks	1	—	1	—	2	2	2
Charcoal Iron	—	—	1	—	1	0.8	1
Millom Hematite Ore & Iron	2	—	—	—	2	2	3
United Steel: Workington	2	—	—	1	3	3	3
TOTAL	5	—	2	1	8	7.8	9

Lincolnshire.

Appleby-Frodingham Steel	—	4	—	—	4	4	4
Lysaght's Scunthorpe Works	—	3	—	—	3	3	3
Thomas, R., & Baldwins: Redbourn	—	3	—	—	3	3	3
TOTAL	—	10	—	—	10	10	10

North-East Coast.

Consett Iron	—	3	—	—	3	3	3
Dorman Long (Steel): Acklam	—	2	—	—	2	2	4
Redcar	—	—	—	—	—	—	2
Bessemer	—	2	—	1	3	3	3
Clay Lane	—	2	—	—	2	2	2
Gjers, Mills	2	—	—	—	2	2	3
Skinningrove Iron	—	1	—	—	1	1.9	3
South Durham Steel & Iron:							
West Hartlepool	—	2	—	—	2	2	3
Cargo Fleet	—	2	—	—	2	2	3
TOTAL	2	14	—	1	17	17.9	26

Scotland.

Bairds & Scottish Steel: Gartsherrie	1	1	—	—	2	2	4
Carron	—	—	1	—	1	1	2
Colvilles: Clyde Iron Works	—	3	—	—	3	3	3
Ravenscraig	—	1	—	—	1	1	1
TOTAL	1	5	1	—	7	7	10

South Wales and Monmouthshire.

Guest Keen Iron & Steel: Cardiff	1	2	—	—	3	3	4
Thomas, R., & Baldwins: Ebbw Vale	—	3	—	—	3	3	3
Steel Company of Wales: Margam	—	4	—	—	4	4.2	5
TOTAL	1	9	—	—	10	10.2	12

Further-education Conference

Industrialists who "snapped up" apprentices as soon as they had finished their training with other firms, were criticised by the Lord Mayor of Sheffield, Alderman Harold Slack, when he opened an all-day conference on further education at the Granville College of Further Education in Sheffield on March 4. The conference was organized by the Sheffield Schoolmasters' Association and attended by about 100. The Lord Mayor went on to say that this practice of snapping-up apprentices was growing. "Employers must realise they cannot leave it to other employers to produce trained apprentices and not take part in the apprentice scheme themselves. All employers are expected to take advantage of the facilities being provided for further education," he said.

Diploma Courses

Mr. John H. Osborn, M.P. for Hallam, considered that too many students were being admitted to university management diploma courses who had no capacity for management. "I think it is pathetic to see people taking five-year courses for management diplomas who cannot say boo to a goose or manage themselves, let alone manage a department. It is very frustrating to them to know that they cannot go on to management. Students of management must also learn how to deal with people."

Mr. Osborn thought that the trouble might stem from the fact that at present the only qualifications for entry to a university taken into consideration were

academic ones. "Are those who would best benefit from a university education being denied it because the main criterion is the ability to pass examinations," he asked.

On the question of raising the school-leaving age, Mr. Osborn said the Government had to be satisfied that public opinion was in favour. "I have spoken to many training officers in industry and employers who cannot say the extra year would be of advantage," he said.

Faults in System

Mr. John Hadfield, managing director of Derbyshire Stone, Limited, said there were three main faults in the British education system. Students were not taught effective speech, many did not have a good sense of number, and too few people were taught to think for themselves.

He went on, "I find that if a man has a good brain and knowledge, he is at a great disadvantage if he cannot express himself clearly, grammatically and fluently." Many people too, had a poor sense of number. They could not, for example, easily picture the difference between a thousand and a million, and that made for a distorted view of life.

Other speakers were Mr. H. Parkin, chief education and training officer to the English Steel Corporation, Limited, Sheffield, and Mr. W. G. Lumb, assistant education officer for further education at Sheffield. Alderman A. Ballard, chairman of Sheffield Education Committee, presided, and the conference was wound up by Professor Boris Ford, director of Sheffield University Institute of Education.

POA Minibition

The Purchasing Officers' Association's Minibition, which provides an excellent opportunity for industrial companies to show their products to buyers in an informal atmosphere, is being held this year at the Hotel Metropole, Brighton, from September 28 to 30. The Association's annual conference is being held at the same time. The stands at the Minibition, 5 ft. by 3 ft., are prefabricated and two types are available for table height or floor display. In view of the limited amount of space, no exhibitor may have more than two stands. Readers who would like further details should write to the secretary of the Association at Wardrobe Court, 146A, Queen Victoria Street, London, E.C.4.

British Blast Furnaces in the December Quarter, 1960—*continued*

Staffordshire, Shropshire, Worcestershire, and Warwickshire.

Name of firm.	In blast at end of fourth quarter, 1960.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Goldendale Iron	—	—	1	—	1	1	2
Shelton Iron & Steel	—	3	—	—	3	3	3
Stewarts and Lloyds: Bilston	—	1	—	—	1	1	2
TOTAL	—	4	1	—	5	5	7
Sheffield.							
Park Gate Iron & Steel	—	2	—	—	2	2	2
GRAND TOTAL	9	61	12	4	86	87.0	109

Weekly Average Number of Furnaces in Blast during the December Quarter, 1960, and the Previous Four Quarters

District.	1959.	1960.			
	Dec.	March.	June.	Sept.	Dec.
Derby, Leics., Notts., Northants, and Essex	17.6	18.8	20.6	20.3	20.1
Lancs. (excl. N.-W. Coast), Denbigh, Flint, and Cheshire	4.7	6.5	6.4	6.9	7
Lincolnshire	8.5	10	8.4	9.3	10
North-East Coast	16.1	16.4	17	17.6	17.9
Scotland	5.8	5.9	6.9	7	7
Staffs., Shrops., Worcs., and Warwicks.	4.6	4.6	4.5	5	5
South Wales and Monmouth	11	11	11	10	10.2
Sheffield	2	2	2	2	2
North-West Coast	7.4	8	8	7	7.8
TOTAL	77.7	83.2	84.8	85.1	87.

The following companies have furnaces in course of construction or rebuilding:—J. Lysaght's Scunthorpe Works South Durham Steel & Iron Company, West Hartlepool Works, Colvilles, Ravenscraig Works, Ford Motor Company, and Barrow Ironworks.

Industry in the Midlands

At the February meeting in Birmingham of the Midland Regional Board for Industry, it was forecast that the pace of industrial output in general will increase by four per cent. in 1961. It was stated that, although the overall increase last year in output, compared with the previous 12 months, was even higher at seven per cent, it had been slowed down to only a two per cent rise by the final quarter of 1960.

At the news conference following the Board meeting, Major C. R. Dibben, the chairman, said that the forecast, coupled with signs of recovery in the motor industry "gives grounds for taking a reasonably optimistic view of the future prospects for Midland industry." He said that this optimism depended on various conditions such as: (1) Continuing efforts to increase productivity and keep prices steady; (2) reliefs forthcoming on checks imposed in such forms as purchase tax and Bank Rate; (3) efforts maintained to increase sales in existing overseas markets and in finding new markets abroad, and (4) stock adjustments that may be necessary, being made gradually to lessen the impact on suppliers. He added that there were indications that manufacturers of capital goods, and machine tools, together with the civil engineering and building industries were as busy as they had ever been. There were still persistent demands for skilled men.

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Ford Motor	—	—	1	—	1	1	1
Holwell Iron	—	—	1	—	1	1	3
Lenishaw Iron	—	1	1	—	2	2	2
Sheepbridge	—	1	—	—	1	1·7	2
Stanton Ironworks: Stanton-by-Dale	—	2	3	—	5	5	5
Staveley Iron & Chemical	—	2	2	—	4	3.4	4
Stewarts and Lloyds: Corby	—	4	—	—	4	4	4
Wellingboro' Iron	—	2	—	—	2	2	3
TOTAL	—	12	8	—	20	20·1	24

Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.

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Darwen & Mostyn Iron	—	—	—	1	1	1.1	2
Lancashire Steel Manufacturing	—	2	—	1	3	3	4
Summers, John	—	2	—	—	2	1·9	2
TOTAL	—	5	—	2	7	7.0	9

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Staffordshire, Shropshire, Worcestershire, and Warwickshire.

Name of firm.	In blast at end of fourth quarter, 1960.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Goldendale Iron	—	—	1	—	1	1	2
Shelton Iron & Steel	—	3	—	—	3	3	3
Stewarts and Lloyds: Bilston	—	1	—	—	1	1	2
TOTAL	—	4	1	—	5	5	7
Sheffield.							
Park Gate Iron & Steel	—	2	—	—	2	2	2
GRAND TOTAL	9	61	12	4	86	87.0	109

Weekly Average Number of Furnaces in Blast during the December Quarter, 1960, and the Previous Four Quarters

District.	1959.	1960.			
	Dec.	March.	June.	Sept.	Dec.
Derby, Leics., Notts., Northants, and Essex	17.6	18.8	20.6	20.3	20.1
Lancs. (excl. N.-W. Coast), Denbigh, Flint, and Cheshire	4.7	6.5	6.4	6.9	7
Lincolnshire	8.5	10	8.4	9.3	10
North-East Coast	16.1	16.4	17	17.6	17.9
Scotland	5.8	5.9	6.9	7	7
Staffs., Shrops., Worcs., and Warwicks.	4.6	4.6	4.5	5	5
South Wales and Monmouth	11	11	11	10	10.2
Sheffield	2	2	2	2	2
North-West Coast	7.4	8	8	7	7.8
TOTAL	77.7	83.2	84.8	85.1	87.

The following companies have furnaces in course of construction or rebuilding:—J. Lysaght's Scunthorpe Works South Durham Steel & Iron Company, West Hartlepool Works, Colvilles, Ravenscraig Works, Ford Motor Company, and Barrow Ironworks.

Industry in the Midlands

At the February meeting in Birmingham of the Midland Regional Board for Industry, it was forecast that the pace of industrial output in general will increase by four per cent. in 1961. It was stated that, although the overall increase last year in output, compared with the previous 12 months, was even higher at seven per cent, it had been slowed down to only a two per cent rise by the final quarter of 1960.

At the news conference following the Board meeting, Major C. R. Dibben, the chairman, said that the forecast, coupled with signs of recovery in the motor industry "gives grounds for taking a reasonably optimistic view of the future prospects for Midland industry." He said that this optimism depended on various conditions such as: (1) Continuing efforts to increase productivity and keep prices steady; (2) reliefs forthcoming on checks imposed in such forms as purchase tax and Bank Rate; (3) efforts maintained to increase sales in existing overseas markets and in finding new markets abroad, and (4) stock adjustments that may be necessary, being made gradually to lessen the impact on suppliers. He added that there were indications that manufacturers of capital goods, and machine tools, together with the civil engineering and building industries were as busy as they had ever been. There were still persistent demands for skilled men.

Personal

Mr. A. C. CORBETT has been appointed a director of F. H. Lloyd & Company, Limited.

Mr. A. F. THOMAS has been appointed by the Delta Metal Company, Limited, as an assistant managing director.

Mr. JOHN LANG, Scottish secretary of the Iron and Steel Trades Confederation since 1946, has retired and is succeeded by Mr. JOHN IRVINE.

Mr. K. A. ROBINSON has been appointed to the board of Lancashire Dynamo Electronic Products, Limited, a company in the Metal Industries group.

Mr. W. R. L. WARNOCK, a director of Rockwell Engineers, Limited, has joined the board of the parent, Coventry Gauge & Tool Company, Limited.

Mr. JOHN W. ATWELL has been appointed an additional director of G. & J. Weir Holdings, Limited. He is managing director of its subsidiary G. & J. Weir, Limited.

Mr. J. BARON, who recently resigned as managing director of John J. Smithies, Limited, Rochdale ironfounders, has been elected president of Rochdale Reform Club.

The Minister of Labour has appointed the EARL OF FEVERSHAM as chairman of the National Advisory Council on the Employment of the Disabled in succession to the late LORD VERULAM.

Mr. STANLEY MARKLAND has been appointed deputy managing director of Leyland Motors, Limited. He will continue as works director of the company and managing director of Albion Motors, Limited.

The Locomotive and Allied Manufacturers' Association of Great Britain announce the reappointment of LORD CHANDOS as president of the Association, and Mr. G. COLLINGWOOD as chairman for the ensuing year.

Secretary of Tweedales & Smalley, Limited, textile-machinery manufacturers, Castleton (Lancs), since 1956 and a director since 1958, Mr. J. G. DOULL has resigned. He will be succeeded as secretary by Mr. C. E. SALTHOUSE.

On retirement after 60 years' service in the foundry industry, Mr. ROBERT HAY received a presentation of a wrist-watch from his colleagues in the light-castings shop of Cruikshank & Company, Limited, Denny Iron Works, Stirlingshire.

Mr. RALPH W. BECK has been appointed executive vice-president of Molins Machine Company, Incorporated, the US subsidiary of Molins Machine Company, Limited, of London, manufacturers of machinery for the cigarette industry.

Mr. A. CROCKETT (works manager) has been elected a director of the Brooke Tool Manufacturing Company, Limited, Greet, Birmingham, and Mr. J. LAMB has been elected a director of the subsidiary, Brooke Tool Automation, Limited.

Mr. C. MACPHERSON, since 1954 principal engineer surveyor at New York for Lloyd's Register of Shipping, is to retire at the end of this month. He will be succeeded by Mr. R. R. HOLTUM, senior ship and engineer surveyor at New York.

Mr. L. OLDHAM has been appointed a director of Robert McArd & Company, Limited, Crown Works, Denton, Manchester, and will continue as secretary of the company. Mr. W. F. MARSH has been appointed works director, and Mr. G. C. ADAMS, sales director.

Col. PERCY H. JONES, chairman of Harts Hill Iron Company, Limited, and vice-president of N. Hingley & Sons, Limited, has been appointed chairman of the Halesowen Steel Company, Limited, in succession to Mr. C. S. BURCH who has retired because of ill health.

Mr. R. McL. FAIRFIELD has been appointed to the board of Submarine Cables, Limited, jointly owned by Associated Electrical Industries, Limited, and British Insulated Callender's Cables, Limited, having joined the board in 1954 as director of production and engineering and later as director (home operations).

Mr. J. R. RICHARDSON, chairman and managing director of Richardson Engineering (Birmingham), Limited, has been elected chairman of the Birmingham area committee of the National Union of Manufacturers. Mr. Richardson is a member of the Institute of British Foundrymen and of the Institute of Vitreous Enamellers.

Mr. D. K. BRITTON, general manager, market and economic research department, Massey-Ferguson (United Kingdom), Limited, has been elected to the new Chair of Agricultural Economics of the University of Nottingham as from June 1. He will be head of the Department of Agricultural Economics and a provincial agricultural economist.

In his appointment as group publicity director to the Firth Cleveland group, Mr. GRAHAM COOKE will head a new division for the co-ordination and control of advertising and public relations for the group and its member companies. Mr. Cooke retains his directorship of the Solartron Electronic group which is now part of the Firth Cleveland group.

Dr. T. E. ALLIBONE, C.B.E., F.R.S., director of Associated Electrical Industries, Limited, research laboratory at Aldermaston, has been elected chairman of the Committee for Engineering and Metallurgy at Sheffield University, in sucession to Dr. H. BULL. The committee is concerned with research carried out at the two departments of Sheffield University.

Mr. R. S. GOODHIND, principal personnel officer at Newton Chambers & Company, Limited, Chapeltown, Sheffield, has been appointed to a senior managerial post with a firm at Stoke-on-Trent and leaves the Sheffield district in April. He joined Newton Chambers 10 years ago and was formerly assistant to the district goods superintendent of the LNER in Sheffield.

CIBA (A.R.L.), Limited, announce the following changes in their sales organization:—Mr. D. A. LEITCH, formerly Scottish area manager, is appointed southern area manager; Mr. L. W. TAYLOR becomes Scottish area manager, and Mr. J. M. TURNER, Midlands area manager. Mr. S. Hopwood continues as northern area manager, and Mr. G. Grant as North Midlands area manager.

The chairman (Mr. C. J. LAKE) and the managing director (Mr. C. H. KAIN) were each presented with a gold watch on the completion of 35 years' service with Lake & Elliot, Limited, at the Savoy Hotel on March 1. Senior executives and other directors were also present at the ceremony and the firm's subsidiary, the National Steel Foundry, was represented by Mr. H. M. Braine.

Mr. W. KENNETH G. ALLEN, chairman of W. H. Allen Sons & Company, Limited, Bedford, and Gwynnes Pumps, Limited, Lincoln, is making an extended business tour of Australia during this month and next. On the outward journey he had business discussions in India and Pakistan, and on the return journey from Australia, he will make further business visits in Canada, arriving back in Great Britain early in May.

Record Output of Iron Castings

The final quarter of 1959 marked the full recovery of the ironfounding industry from recession, and 1960 was characterized by steady progress or sustained output in most sections of the industry, states the Joint Iron Council in its comment on the figures released by the Iron and Steel Board. Only in the automobile and pressure-pipe sections did output fall at all noticeably in the course of the year and this reduction was confined to the latter months. Even for these sections the reduction was marginal, and was more than made up by progress in other fields. In 1960 the industry produced a greater tonnage of castings than in any previous year. Total output of iron castings in the fourth quarter of 1960 at 1,024,700 tons compared with 989,200 tons in the fourth quarter of 1959—an increase of 3½ per cent. Output for the year 1960 at 3,967,600 tons was nearly 13½ per cent. higher than in 1959.

Main Sections

The automobile section, which had a busy year in 1959, went ahead again in 1960, exceeding the previous year's output by 12½ per cent. Towards the end of the year the difficulties developing in the motor-vehicle industry made themselves felt, but these were cushioned, as far as the foundries were concerned, by the relative buoyancy of demand for tractors and commercial vehicles. The engineering section, in sympathy with some of the capital goods industries it serves, experienced steady progress as general capital expenditure on plant and machinery rose.

A small rise in the building and domestic sections was comprised of a significantly greater increase in output of castings for building and construction purposes combined with a slight reduction in output of castings for domestic durable goods. Production of pressure-pipes and fittings was firmly maintained although some reduction was experienced in the final quarter. Output of ingot moulds rose steeply to meet the needs of the steel industry. The railway-equipment section which had been experiencing rather weak trading conditions up to the middle of the year achieved a marked increase in output in the second half. Details of output, including both grey and malleable iron, are shown in Table 1 below.

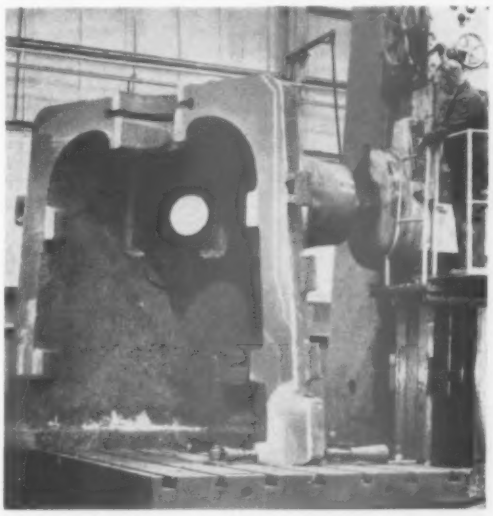
Labour

The number employed in the ironfounding industry at the end of December, 1960, was 131,400. This is 100 more than three months ago and 3,900 more than at the end of December, 1959.

The death occurred on February 24 at the age of 78 of Mr. THOMAS WALKER, formerly secretary of J. Haigh & Sons, Limited, Priestroyd Ironworks, Huddersfield, by whom he was employed for 37 years prior to his retirement in 1952.

Power from Castings

Four castings, weighing on average 10 tons each, have recently been supplied by the David Brown Foundries Division, Penistone, near Sheffield, for turbines which will be among the biggest electrical generating units in Britain. They will be installed at the Central Electricity Generating Board's power-station at West Thurrock, Essex, and each turbine will have an output of 300 Mw. At present the CEGB's largest generating-sets are 200 Mw.



Rough machining one of the outer-cylinder castings made by David Brown Industries, Limited (Foundries Division), for West Thurrock power-station.

The David Brown castings, ordered by the turbine-generator division, Manchester, of Associated Electrical Industries, Limited, comprised top- and bottom-halves of the outer case for the high-pressure cylinders. As cast, the top-halves weighed 9½ tons each and the bottom halves 10½ tons each. All four were rough-machined before delivery to AEI.

The 300 Mw. sets will operate at initial steam conditions of 2,300 lb. per sq. in. gauge and 1,050 deg. F., with re-heat to 1,050 deg. F. The steam inlet will be into the inner cylinder, with subsequent exhaust into the outer cylinder at lower pressure and temperature.

TABLE 1.—*Output of Iron Castings, by Section.* (*Thousand Tons.*)

Section.	1959.	1960.	Percentage change.	1959 Fourth quarter.	1960 Fourth quarter.	Percentage change.
Automobile (including tractors)	678.0	763.3	+12.6	193.0	181.7	− 5.9
Engineering*	1,127.1	1,286.7	+14.2	309.8	339.1	+ 9.5
Building and domestic	548.7	559.6	+ 1.9	154.7	148.8	− 3.8
Pressure-pipes† and fittings	515.6	558.4	+ 8.3	149.0	140.2	− 5.9
Ingot moulds‡	389.4	539.7	+38.6	123.4	144.7	+17.3
Railway equipment	239.3	259.9	+ 8.6	59.3	70.2	+18.4
Total	3,498.1	3,967.6	+13.4	989.2	1,024.7	+ 3.6

* Including machine tool, textile machinery, electrical, shipbuilding, etc. † Mainly gas and water. ‡ Mainly for the steel industry.

AI Merchants' Conference

Approximately 600 builders' merchants who do business with Allied Ironfounders' group of companies joined executives of the firms and guests at a conference in London early last week. The gathering was preceded on the Sunday evening by a dinner for Allied's sales executives held in the Kensington Palace Hotel. On Monday morning, there was a visit by a large party to the Ideal Home Exhibition at Olympia, particularly to preview the firm's "Beauty in the Bathroom" exhibit, displays of cookers, etc. Returning to the West End, the company numbering about 450, were entertained to luncheon by the firm at the "Talk of the Town" restaurant, following which the afternoon's conference (in the same premises) was devoted to business matters. That same evening, members of the party reassembled for dinner at Quaglino's with Mr. G. S. Steven, chairman and joint managing director of Allied, presiding. On the next day, Tuesday, there was a second party to visit Olympia Exhibition, with luncheon later at the Byron Hotel *en route* for the British Bath Company's works at Greenford, a firm prominent in the Allied group. Both enamel shops and foundry were toured by the visitors who included over 70 representatives from leading builders' merchants, the visitors were received by Mr. Maurice Jones; production here now averages about 4,000 baths per week.

Business Matters

At the conference on Monday afternoon, proceedings were opened by Mr. G. S. Steven (chairman of Allied) and afterwards Mr. H. C. Wilson Bennetts, joint managing director, explained revised terms which the group were now offering to the merchants. These had been modified from last year's arrangements to accommodate inequalities which had become apparent. In essence, the changes were to permit "off invoice" rebates on merchants' turnover based on assessment of total potential buying capacity in the various product lines. Quantity discounts were also modified.

The acquisition of Bilston Foundries by the Allied group was referred to briefly, Mr. Wilson Bennetts stating that as a result, the Allied group were now "incomparably the largest organization in the country in the bath trade, producing about 60 per cent. of the country's output."

Other matters dealt with by the speaker included central heating. He said that within a measurable space of years the firm was confident that no house would be built in this country without this facility. Much of this central-heating load, he was convinced, would be carried by solid-fuel-fired units on the score of economy—and not only by reason of the price of the fuel, which he claimed was still far cheaper in terms of BTU output than were piped fuels. Finally, Mr. Wilson Bennetts referred to the opening shortly of a sales school at the firm's research and development department in Smethwick to give instruction to merchant salesmen on appliances manufactured by the group. During the next two years, Allied will be spending nearly £1 million on improving productive efficiency in their rainwater and soil goods division, he said. He ended on a plea that a joint committee might be formed between representatives of the builders' merchants and Allied which could meet during the year and discuss joint problems.

Other speakers during the afternoon were Mr. F. M. Jones, sales director of Allied's bath division, introducing the group's new lines in baths and their scheme to popularize them. Amongst other sales-promotion schemes, Allied are running a competition with prizes worth £1,000 to find the perfect bath and details of this were quoted to the assembly. Other speakers during the afternoon were drawn from among the merchants present, who commented freely on their relations with the group and reactions to the various schemes.

Equipment and Supplies

Constructional Engineering's Link-up

Constructional Engineering Company, Limited, Charles Henry Street, Birmingham 12, has now become a member of the B.H.D. Engineers, Limited, along with W. C. Holmes & Company, Limited, B. Thornton & Company, Limited, the Bryan Donkin Company, Limited, British Furnaces, Limited, and other companies.

Constructional Engineering Company, Limited, design and manufacture melting and raw-materials-handling equipment for iron and steel foundries. A range of grit arresters is manufactured and on new projects there is to be co-ordination with the gas-cleaning division of W. C. Holmes & Company, Limited, Huddersfield. For heat-treatment applications, Constructional Engineering will have the advantage of collaborating with British Furnaces, Limited, of Chesterfield, who are well established on applications and furnace design. The merger of Constructional into B.H.D. Engineers, Limited, will enable it to offer not only its traditional range of equipment but also to cater on a more comprehensive basis for projects in the ironfounding and steelmaking industries.

Next year, Constructional will celebrate its 50th anniversary. Recent installations of melting equipment made by the firm include plant at Thomas Potterton, Limited—one of the first hot-blast cupola units (having an independent oil-fired blast-heater) designed to meet the requirements of the Clean-Air Act.

(As announced in last week's issue of the JOURNAL the new board of Constructional Engineering is: Mr. F. Brian Holmes, chairman; Mr. F. H. Hoult, managing director; Mr. P. Rushworth, Mr. S. Farrer, and Mr. J. E. Wigley.)

Centrifugal-casting Machines: Foundry Suppliers, Limited, 25a, Cockspur Street, London, S.W.1, have recently taken over the sole agency for the United Kingdom of Great Britain, Northern Ireland, and Eire, for equipment manufactured by the Centrifugal Casting Machine Company, Tulsa, Oklahoma, USA, and have available on request literature about some of the equipment. This includes bulletin No. 160 describing centrifugal horizontal casting machines for the production of cylindrical castings; No. 161 covering the model MLS machine, which is primarily for production of cast-iron cylinder-liners at high rates; No. 260 dealing with the model "M" water-cooled casting machine; No. 158 describing the company's range of vertical casting machines; No. 545 dealing with centrifugal casting of precision investment moulds and No. 157 covering cast-iron soil-pipe production.

Shell Coremaking: Ernest Fairbairn, Limited, of Manfield House, 376/379, Strand, London, W.C.2, have been appointed sole agents for the United Kingdom by Ameresco Inc., of Mont Clair, New Jersey, the export organization of Dependable Shell Core Machines, Inc., of Portland, Oregon, USA. The machines were exhibited at the last AFS foundry exhibition held in Philadelphia and patents have now been applied for in this country. It is reported that despatch can be effected ex-(American) stock; wear-and-tear spares being held in the UK.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d.)

835,644. Herman Pneumatic Machine Company, Union Bank Building, Pittsburgh, Penna., USA.

A flask assembly, particularly adapted for use in centrifugal moulding operations. The apparatus devised by the inventors is claimed to be simple and capable of conversion to form products of substantially different diameters. The assembly has anti-friction bearing means rotatably supporting the flask. The flask and bearing means form a unitary structure which has a mounting device enabling it to be easily fastened to and separated from a similar mounting device of a cradle.

835,787. Erico Products Inc., 2070 East 61st Place, Cleveland, 3, Ohio, USA.

A novel cast/welding composition using a metal producing exothermic reaction mixture. This may comprise copper-oxide, and sufficient aluminium powder to reduce the copper-oxide to metallic copper. Sufficient metallic copper either alloyed or mixed with the aluminium is also added to absorb a substantial part of the heat of reaction and form a portion of the molten product of the reaction. From 2 to 8 per cent. by weight of one or more of silver, zinc, tin, aluminium and nickel is also included as an alloying element.

835,875. Birmingham Small Arms Company, Limited, Armoury Road, Small Heath, Birmingham, 11.

Improvements in die-casting. This invention is especially concerned with the die-casting of metal around a stranded wire cable. Patent **835,876** by the same company relates to a new or improved die-casting machine which may be arranged to operate on a partly- or fully-automatic cycle.

835,958. Constructional Engineering Company, Limited, Titan Works, Charles Henry Street, Birmingham, 12.

Machines for blowing foundry cores. (See also **B.P. 797,585**, FOUNDRY TRADE JOURNAL, September 4, 1958).

The operation of this machine can be summarized thus:—The arrival of a corebox or other mould into position ready for blowing operates a trigger which starts the machine. The trigger actuates a shutter for closing and sealing a sand-charging opening of the container. The closing movement of the shutter operates a blowing valve which admits compressed air to the chamber. A device, responsive to a predetermined pressure, causes the blowing valve to close, and the shutter to reopen for replenishing the container.

836,421. Airtron Inc., Linden, New Jersey, USA.

The cost and method of making high-frequency power terminations can be reduced and simplified by first forming the inlay of dissipative material and then casting a metal jacket on to it.

836,496. Elektro-Thermit G.m.b.H., 125, Gerlingstrasse, Essen, Germany.

Method of, and apparatus for, producing casting moulds for welding workpieces. (See also B.P. **842,095** to be published later.)

837,473/4/5. Hazelett Strip-Casting Corporation, c/o W. S. Rockwell Company, 200, Eliot Street, Fairfield, Connecticut, USA.

Machines for casting metal strip direct from molten metal.

Australian Patents

Photostat copies of Australian Patents are available from the UK Patent Office, price 9d. per page. The address given, unless otherwise specified is that of the agent for service.

226,146. General Motors Corporation, Phillips, Ormonde Le Plastrier and Nelson, 37-41 Queen Street, Melbourne, Victoria. (28 sheets.)

An improved ferrous-metal alloy comprising carbon 1 to 2.5, silicon 1.5 to 3.2, and boron 0.001 to 0.05 per cent. The remainder is substantially all iron. The alloy has a microstructure, in the as-cast condition, with carbon in the form of compacted graphite.

226,154. Koehring Company, Phillips, Ormonde Le Plastrier and Nelson, 37-41 Queen Street, Melbourne, Victoria. (24 sheets.)

Hydraulic-moulding machine which has a mould clamp assembly for closing, clamping and opening a mould.

226,211. Union Carbide Corporation, c/o Edward Waters and Sons, 422-428 Collins Street, Melbourne, Victoria. (10 sheets.)

A method for desulphurizing a ferrous-metal bath by the injection of a stream of gas laden with comminuted calcium carbide. In this particular Patent the calcium carbide is mixed with oil prior to its introduction into the stream of gas.

226,242. Birmidal Developments, Limited, c/o Clement Hack and Son, 414 Collins Street, Melbourne, Victoria. (nine sheets.)

A process for treating foundry sand. A slurry of sand and liquid is formed and this slurry is then vigorously scrubbed in a container by means of an impeller. A circulating motion is caused, downwards in the middle of the slurry, radially outwards in the lower part, and radially inwards at the upper part.

226,269. Foundry Services, Limited, c/o Edward Waters and Sons, 422-428 Collins Street, Melbourne, Victoria. (12 sheets.)

An additive for the treatment of molten metal. The additive in solid form comprises a compacted intimate admixture of solid particulate carrier material. This latter contains a filler and a compound which sinters on heating. The residue after the gas generation, which comes off as a mass of bubbles, remains as a coherent product.

226,394. American Steel Foundries, c/o Spruson and Ferguson, Caltex House, Kent Street, Sydney. (45 sheets.)

A steel-alloy consisting of carbon 0.20 to 0.50, manganese 0.15 to 2.50, silicon 0.10 to 2.00, phosphorus nil to 0.05, sulphur nil to 0.07 per cent. Molybdenum, chromium and tungsten, either singly or in combination are present in the proportion of nil to 5.00 per cent., nickel nil to 4.00, boron 0.0005 to 0.005, and rare-earth metals 0.0015 to 0.50 per cent. The balance is iron. A casting made of this alloy is claimed to have a Brinell hardness value of 444 or more, and a Charpy impact value of at least 1.66 m-kg at room temperature and 1.38 or more m-kg at −40 deg. C.

226,701. Hazelett Strip-Casting Corporation, c/o Phillips, Ormonde Le Plastrier and Nelson, 37-41 Queen Street, Melbourne, Victoria. (34 sheets.)

A method for casting a continuous metal strip directly from molten metal. The molten metal is fed into the casting region formed by the inner surfaces of two spaced moving bands. At least one of the bands is cooled by propelling a liquid coolant over the outer surface of the band to form a substantially continuous rapidly-moving film of liquid.

New Patents

227,045. Ford Motor Company of Canada, Limited, c/o Edward Waters and Sons, 37-41 Queen Street, Melbourne, Victoria. (seven sheets.)

A three-piece sand mould which has oppositely disposed flanges; a core formed integrally with these flanges, and mould sections adapted to fit securely between the flanges and co-operating with the core and each other, thus forming a uniformly concentric core relative to the mould portions.

227,130. Die Casting Machine Tools, Limited, c/o Spruson and Ferguson, Caltex House, Kent Street, Sydney. (nine sheets.)

In die-casting machines, an air-extraction means is provided, connected by a valve to the die cavity. This valve is operated by or synchronously with the injection system or the control for the injection system, so that the air is extracted from the die cavity as the cast material is forced in.

Belgian Patents

Photocopies of the Patents, from which these abstracts are taken can be obtained from the UK Patent Office, at 9d. per page.

580,965. Philips' Gloeilampenfabrieken, N.V. Emmasingel 6, Eindhoven, Netherlands. (Five pages.)

Process and method for producing moulds from sand with synthetic resin as a binder. First the materials are moulded in the patternplates where they are heated. The moulds are then smoothed while they are in the pattern.

580,315. Rheinstahl Eisenwerke Gelsenkirchen, A.G., Hohenzollernstrasse, 2-4, Gelsenkirchen, Germany. (Four pages.)

Process for the control of casting machines for pouring metals with particular application to centrifugal-casting machines.

580,358/9. National Bureau de Recherches Metallurgiques A.S.B.L., 69 rue du Val-Benoit, Liège, Belgium. (Five pages each.)

Process and method for the treatment of steel under vacuum.

580,390. Blaw-Knox Company, 300 Sixth Avenue, Pittsburg, Penn., USA. (Eight pages.)

Process for the casting of homogenous-metal parts. The metal is poured into a mould, then into this is poured at least one element fusible at the temperature of the molten metal, which is then subjected to vibrations.

581,118. Mannesmann, A.G., Mannesmannufer 1b, Düsseldorf, Germany. (Four pages.)

Process for the drying by reduced pressure or suction, of casting ladles and moulds, and the like.

581,119. Mannesmann, A.G., Mannesmannufer 1b, Düsseldorf, Germany. (Three pages.)

Process for the degasification of molten iron and steel in the foundry ladle. This is effected not only on the surface of the melt, but also in the lower regions of the ladle by openings being provided in the ladle casing.

581,213. British Iron and Steel Research Association, 11, Park Lane, London, W.1. (Seven pages.)

Improvements in continuous-casting processes.

Company News

Steel Issues Success

About 47,600 applications were received for £136,000,000 nominal of the steel company prior charges offered for sale early this month by the Iron and Steel Holding and Realisation Agency. Nominal value of the stocks offered amounted to £105,260,000, but they were marketed for just over £85,000,000. Except in the case of the offer of £40,000,000 5½ per cent. debenture stock of Steel Company of Wales, Limited, all the offers were oversubscribed.

An announcement by ISHRA said that applications for SCOW stock, including all special applications from underwriters, totalling some £35,000,000, had been accepted in full, and, in addition, sub-underwriters had been called upon to take up £500 stock per unit sub-underwritten. In the case of the remaining offers, approximately 68 per cent. of each security has been absorbed by special applications from underwriters who had asked the agency to accept their applications in full. Dealings in all the securities started last week. The basis of allotment for the remaining offers is as follows: Colvilles, 4½ per cent. debenture, 1975-85, £10,000 in full, above 50 per cent., with maximum of £33,000; 5½ per cent. cumulative preference, 100 shares in full, above 24 per cent. with maximum 5,000 shares; Consett Iron, 5 per cent. redeemable debenture, £20,000 in full, above 41 per cent. with no maximum; Dorman Long, 4½ per cent. unsecured loan stock, £500 in full, above 35 per cent., maximum of £5,000; 5½ per cent. cumulative preference, 700 shares in full, above 18 per cent., maximum of 20,000 shares.

United Steel, 4½ per cent. debenture, £5,000 in full, above 57 per cent., maximum £15,000; 4½ per cent. cumulative preference, 300 in full, above 28 per cent., maximum 10,000 shares; 5¼ per cent. redeemable cumulative preference, 300 in full, above 23 per cent., maximum 10,000 shares; Stewarts and Lloyds, 5½ per cent. cumulative preference, 2,000 shares in full, above 49 per cent., maximum 20,000 shares; 5½ per cent. redeemable cumulative preference, 1,500 in full, above 14 per cent., maximum 20,000 shares; John Summers, 5½ per cent. cumulative preference, 400 shares in full, above 15 per cent., maximum 10,000 shares.

THOS. W. WARD, LIMITED—Interim dividend for the year ending June 30, 1967, is raised from the equivalent of 2½ per cent. to 3¾ per cent.

GENERAL REFRACTORIES, LIMITED—Final dividend of 17½ per cent. makes 25 (20) per cent. for 1960. Group net profit rose to £622,278 (£408,229), after tax of £667,821 (£357,090).

THOS. FIRTH & JOHN BROWN, LIMITED—Of the 4½ per cent. redeemable debenture stock, 1980-85, £17,400-worth has been purchased and cancelled, leaving £2,837,250 in issue.

MONSANTO CHEMICALS, LIMITED—Group net profit for the year ended December 31, 1960, was £1,700,342 (£1,693,266), after tax of £1,251,016 (£1,194,396), and the final dividend of 10 per cent. makes a 15 per cent. total.

F. W. BERK & COMPANY, LIMITED, chemical manufacturers and bonding clay specialists, of London, W.1—Profit before taxation for the year to December 31, 1960, was £679,000 (£522,520). A final dividend of 6d. per share on the 5s. ordinary shares is recommended, which makes a total of 8¼d. (7½d.) per share. Provisional arrangements have been made to acquire on a share exchange basis the whole of the share capital of St. Albans Sand & Gravel Company, Limited, a private company with a net book asset value of £633,000.

News in Brief

ANNUAL DINNER of the industrial machines department of the English Electric Company, Limited, Bradford, was held at Fountain Hall, Bradford, on March 3.

A CONTRACT valued at almost $1,250,000 for a new flour mill for the Central Philippine Milling Corporation has been placed with Thomas Robinson & Son, Limited, Rochdale.

BAKER PERKINS, LIMITED, have secured orders worth £100,000 from the Midlands Co-operative Laundries' Association for Carousel washing machines, a fully-automatic laundry unit.

ANGLO/CZECHOSLOVAK TRADE ARRANGEMENTS for 1961 include an item which will allow British manufacturers of crucibles to export their productions to Czechoslovakia up to the value of £5,000 during the year.

A. J. FLATLEY, LIMITED, manufacturers of domestic appliances, Manchester, are to build a factory at Bantry, County Cork, where it is expected production of clothes dryers and washing machines will start by midsummer.

TEN NEW MEMBERS of the "25-Association" of Millspaugh, Limited, Sheffield, have been presented with clocks to mark their 25 years' continuous service with the company. Among recipients was Mr. E. Ayres, works director, who started with the firm as a boy.

A BUS taking steelworkers to the Appleby-Frodingham Steelworks at Scunthorpe on March 1 skidded at Limber, near Grimsby, 31 miles away, and somersaulted into a field. The driver, Miss G. Goode, and 20 passengers were injured. Six men were detained in hospital.

HEPWORTH IRON COMPANY, LIMITED, the Hazlehead (Yorks) manufacturers of sanitary pipes, have acquired for cash 80 per cent. of the issued capital of Fred Temperley & Son, Limited, of Todmorden, and its wholly-owned subsidiary company, J. Duckett & Son, Limited, Burnley.

ORDERS FOR TWO DIESEL ENGINES for cargo ships being built at Sunderland have been placed with the marine engineering firm of John G. Kincaid & Company, Limited, Greenock. Both engines will be of Burmeister & Wain type, one developing 7,800 h.p. and the other 6,300 h.p.

THE BOARD OF EXCELSIOR MOTOR COMPANY, LIMITED, state that "the difficult trading conditions" in the motor-cycle field brought about by credit restrictions continue. Following a successful international boat show the marine division is progressing both in respect of home and export sales.

WHEN A LADLE holding eight tons of molten metal exploded at the Brightside Foundry & Engineering Company, Limited, Newhall Road, Brightside, Sheffield, last Thursday, one man was killed and four others injured. The explosion occurred when the metal was being poured into a chill.

WORK BEGINS NEXT MONTH on the new £1,500,000 factory at Sunderland of the Bradford engineering firm of Hepworth & Grandage, Limited. It will be built in two phases, the first a machine-shop, which will be in production in 1962, and the second, a two-storey foundry which will be started on later this year. The 22-acre site allows for further expansion.

SPEAKING AT THE FIRST ANNUAL DINNER and prize presentation of the Head Wrightson Motor Club held in the Teesdale Hall, Thornaby, Mr. J. G. Allen, managing director of Head Wrightson Steel Foundries, Limited, at Stockton, disclosed there was a possibility of a new steelworks plant in Australia for Head Wrightson & Company, Limited, of Thornaby.

TWO MORE BIRMINGHAM FIRMS—J. C. Peacock (Engineers), Limited, and Compression Joints, Limited—are negotiating to open factories on Weston-Super-Mare's new industrial estate at Oldmoxon. The former will employ between 120 and 150, whilst the latter will start with a labour force of about 250 and the 65,000 sq. ft. factory will later be doubled in area.

SOME 200 GUESTS attended the fourteenth annual staff dinner/dance of Allied Ironfounders, Limited (Northern Group), at Falkirk. Principal guests were Mr. H. C. Wilson Bennetts, joint managing director of Allied Ironfounders, Limited, and Mr. A. K. Craighead, director and secretary of the company; Mr. R. L. Hunter, managing director of the northern group, presided.

YORKSHIRE ELECTRICITY BOARD is increasing its charges. As from April 1, the average domestic consumer (five rooms 1,700 units a year) will pay an extra 8½d. a week; the average commercial consumer (1,000 sq. ft., 3,000 units a year) an extra 1s. 4d. a week; industrial users (3 kw., 3,000 units a year) 1s. 2½d. a week extra; and a typical farm consumer (3 kw., 3,000 units a year) 1s. 4d. extra.

A PROCESS OF HIGH-SPEED-STEEL MAKING invented by Mr. William Kelsey, a director of the Inca Steel Company, Limited, Sheffield, and of the parent company, C. R. Denton Steel & Tool Company, Limited, was the theme of a film shown at the Grand Hotel, Sheffield, on March 9. The process is being developed in conjunction with Foseco International, Limited, of which Foundry Services, Limited, is a subsidiary.

TEXTILE MACHINERY is being exhibited at the British Trade Fair in Moscow from May 19 to June 4 by three Yorkshire firms. They are Dracup & Sons, Limited, Bradford, Sellers & Company (Huddersfield), Limited, and Charles Walker & Company, Limited, Leeds. Dracup's will show a 1,320-double-lift double-cylinder Vincenzi pitch jacquard machine and a single Wilton jacquard for weaving carpets up to 5½ metres wide.

RADIATION, LIMITED, of Warrington, are changing the names of two of their subsidiary companies. Radiation Groups Sales, Limited, who market New World appliances for the home market, is to be known as Radiation New World, Limited, while Fletcher Russell & Company, Limited, has become Radiation Catering Equipment, Limited. Mr. A. O. Russell has been appointed a director and general sales manager of Radiation Catering Equipment, Limited.

A THIRD 200-tons-a-day oxygen-plant is being built by British Oxygen Company, Limited, for Richard Thomas & Baldwins, Limited, for their new steelworks near Newport, Mon. The plant, scheduled to be ready for operation early in 1963, brings the total daily capacity of plant to be installed and operated by BOC at Spencer Works to 600 tons of high-purity oxygen. The two first 200-ton plants are scheduled to be ready for operation towards the end of this year.

THE AMERICAN *Metal Market* reports the introduction of the world's smallest turbo-prop engine for light aircraft built by the British Rover Company, Limited. The new 60 or 90 h.p. vibrationless engines weigh only 235 lb., are 30-in. long. The structural housing and many other parts are made mostly of aluminium-alloy castings although the exhaust and inner-cylinder cone are of stainless steel. The engine is said to be a by-product of the firm's programme to design gas-turbines for cars of the future.

News in Brief

BRITAIN'S DOMESTIC ELECTRICITY CONSUMPTION is only half that of "more go-ahead" countries because the British housewife refuses to adopt modern methods said Mr. Philip Honey, of London, when he spoke to 400 delegates at the conference of the Electrical Development Association at the Royal Hall, Harrogate. He said the clean-air movement was still making only slow progress, despite half the smoke in most towns coming from domestic fires. Mr. David Irving, chairman of the London Electricity Board, said Britain had hardly begun to use electricity in the home compared with the United States and other countries.

TO SUIT THE SPECIAL REQUIREMENTS of students' residential quarters, M. Cockburn & Company, Limited, of Falkirk (an Allied Ironfounders' subsidiary) has developed a new design of wash-basin. It is made of cast iron with a white Duramel enamel finish, and has an especially deep flat-bottomed bowl and wide surround to permit washing of clothes. Its overall length is 30 in.; width, front to back, is 17 in., and depth of basin is 9½ in. Installation of the "College" basin has already been made in the 198 study-bedrooms of the Battersea College of Advanced Technology, and in the 80 bedrooms of the hostel block of Sheffield's new City Training College.

GUESTS AT THE CUTLERS' FEAST last Tuesday evening, included Sir Cyril Musgrave, chairman of the Iron and Steel Federation; Mr. W. F. Cartwright, president of the Iron and Steel Institute; Lord Plowden, vice-chairman of the Tube Investments group; Lord McCorquodale, president of the British Employers' Confederation; Major General C. Lloyd, director of the City and Guilds of London Institute; Mr. Leon Daum, a former member of the High Authority of the European Coal and Steel Community; Sir Roger Makins, chairman of the Atomic Energy Authority, and Sir Reginald Verdon Smith, chairman of the Bristol Aeroplane Company. The chief guest was Mr. Edward Heath, Lord Privy Seal.

JOHN TAYLOR & COMPANY, LIMITED, bellfounders, of Loughborough (Leics), have secured a contract to cast the 53 bells for and to build a grand carillon for the National Episcopal Cathedral in Washington. With the largest bell weighing 10 tons and the total weight of all the bells being about 57 tons, it is the biggest carillon to be produced by the firm. The new cathedral has been in course of erection since 1907 and the carillon is to be known as the Bessie L. Kibbey Carillon; bearing the donor's name. Another order received by the company is for a new peal of six bells for the Barwick-in-Elmet Parish Church, near Leeds. The three original bells have been restored at a cost of £1,000 and three new ones added at a cost of £750.

THE INSTITUTION OF PLANT ENGINEERS, 2, Grosvenor Gardens, London, S.W.1, announce that the fourteenth annual conference of the Institution will be held at the Imperial Hotel, Blackpool, from April 19 to 21. The Council of the Institution is again making the Conference available to a limited number of non-members from industrial concerns who wish to nominate senior staff to attend. The programme includes a number of authoritative papers of wide scope and interest, and generous provision has been made for discussion. The presidential address will be delivered by Mr. G. D. Jordan, and the principal speaker at the Conference dinner will be Mr. T. S. Kilpatrick, director and general manager of Steel, Peech & Tozer, branch of the United Steel Companies, Limited.

Obituary

The death is announced from Australia of Mr. P. N. DAVIES, chairman of Davies & Baird, Pty., Limited, of Brunswick, N.10, Melbourne. He was a well-known steel founder and had many friends in this country.

Mr. HENRY HARDWICK, chairman of the Joint Gardening Association of Ruston & Hornsby, Limited, and Ruston Bucyrus, Limited, Lincoln, has died at the age of 61. He worked for Ruston & Hornsby for more than 40 years.

The death has occurred of Mr. HENRY CUNNINGTON, for some years confidential secretary to the chairman and managing director of Robey & Company, Limited, engineers, Lincoln. He had worked for the firm since 1915, and was due to retire in May.

The death is reported of Mrs. JANE WILSON, a director of Wilson & Jubb (Leeds), Limited, lead smelters, refiners, lead pipe and printing metal manufacturers. She was a founder member of the company, with which she had been associated for more than 30 years.

The death has occurred at the age of 57 of Mr. FRANCIS BRADLEY, foundry manager and a director of Bailey Pegg & Company, Limited, Brierley Hill, S. Staffs. Mr. Bradley who had been with the firm for 45 years, was one of the rapidly-dwindling band of ironmoulding craftsmen of the old school.

Mr. CHARLES R. HUTCHESON, sales director of Chambers Brothers, Limited, and C.H.B. (Merchants), Limited, both of Stoke Street, Sheffield, and of Jethro Chambers (Sheffield), Limited, Wadsley Bridge, Sheffield, ganister manufacturers, died on February 25 at the age of 61. He was president of the Sheffield Caledonian Society in 1958 and had been a member for about 30 years.

Mr. JUSTUS SJÖGREN, chairman of Sandvik Swedish Steels, Limited, Halesowen, Birmingham, and Sandvik Steel Band Conveyors, Limited, Selly Oak, Birmingham, died on February 21 at his home in West Malvern, Worcestershire, at the age of 82. Mr. Sjögren came over to this country in 1901 and pioneered the development of the Sandvik organization in Great Britain. He was chairman and managing director of Sandvik Swedish Steels, Limited, from 1914 until 1947, when he left the latter post but continued as chairman, and was chairman of Sandvik Steel Band Conveyors, Limited, from 1921. He was consul for Sweden in Birmingham from 1920-1948. Mr. Sjögren was awarded the Order of Wasa and the Order of Nord Stjärnan (the Order of the North Star), for his contribution to Anglo/Swedish trade and cultural relations.

The death as the age of 69 occurred on February 28 of Mr. H. BASIL DARBY, chairman of Darby & Company (Birmingham), Limited, and of associated companies, Darby & Company (Aston), Limited, and Darby & Company (Dublin), Limited. Mr. Darby spent all his working life in the pig-iron, steel, refractory and coke merchanting business founded by his father, Mr. William Darby, the family being descendants of the celebrated Abraham Darby of Coalbrookdale fame. Mr. Basil joined the firm after the first world war and was the senior partner in what was then a private company until the present firm was formed about seven years' ago. In manufacturers' association matters, one of his chief interests was as chairman of the Steel Distributors' Association which he was largely instrumental in founding in the middle '30s; he was also active in the Foundry Coke Merchants' Association. Mr. Darby's presence will be missed from many gatherings of foundrymen.

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Pig-iron and Steel Production

Statistical Summary of December, 1960 Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in December. Table 3, weekly average production of finished steel in November. Table 4 gives the production of pig-iron and ferro-alloys in December, and furnaces in blast. (All figures are weekly averages in thousands of tons).

TABLE 1.—*Iron and Steel Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imptd. ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.	Basic materials.[1]						Imports.[2]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[3]
1959 .. .	340	497	477	286	244	210	242	208	7	388	291	2,244
1960	339	505	482	329	319	264	303	243	24	467	362	2,714
1960—Sept. ..	339	520	473	336	317	265	306	252	25	481	391	2,644
Oct. ..	339	520	472	344	332	273	314	256	17	497	385	2,625
Nov. ..	339	538	474	344	337	279	315	266	20	505	370	2,686
Dec. ..	339	538	473	325	336	272	306	232	18	451	340	2,714

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in December.*

District.	Open-hearth.		Bessemer and LD.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Steel for Castings.	
Derbys, Leics, Notts, Northants, and Essex ..	—	4.2	15.1 (basic)	2.4	0.1	20.6	1.2	21.8
Lancs. (excl. N.-W. Coast), Denbighs, Flints, and Ches	1.2	34.0	—	5.0	0.3	39.2	1.3	39.2
Yorkshire (excl. N.-E. Coast and Sheffield) ..								1.3
Lincolnshire	—	48.4	—	—	0.1	48.4	0.1	48.5
North-East Coast	0.6	96.4	—	1.5	0.4	97.0	1.9	98.9
Scotland	1.2	51.2	—	4.0	—	54.1	2.3	56.4
Staffs, Shrops, Worcs, and Warwicks	—	24.4	—	3.6	0.7	27.0	1.7	28.7
S. Wales and Monmouthshire	1.7	75.3	17.8 (basic)	0.8	0.1	95.2	0.5	95.7
Sheffield (incl. small tonnage in Manchester) ..	7.2	33.1	—	13.3	0.3	51.9	2.0	53.9
North-West Coast	0.1	—	5.8 (acid)	0.8	—	6.5	0.2	6.7
Total	12.0	367.0	38.7	31.4	2.0	439.9	11.2	451.1
November, 1960[4]	14.3	412.3	39.9	35.7	2.3	492.2	12.3	504.5
December, 1959[4]	11.2	354.7	36.4	28.6	2.0	422.6	10.3	432.9

TABLE 3.—*Deliveries of New Non-alloy and Alloy Finished Steel.*

Product.	1958.	1959.	1960.		
			Nov.	Oct.	Nov.[4]
Non-alloy steel:					
Ingots blooms, billets, and slabs[5]	4.6	5.1	6.6	5.4	6.4
Heavy rails ..	10.2	6.8	6.2	9.2	8.4
Sleepers ..	1.2	0.6	0.2	0.9	0.8
Fish and soleplates	0.7	0.4	0.2	0.6	0.6
Plates, 3 mm. thick and over:	47.3	43.1	49.4	59.2	57.5
Other heavy prods.	41.8	41.2	53.9	60.2	54.8
Ferro-concrete bars	7.6	9.6	12.2	13.5	12.6
Wire rods	21.5	23.5	28.0	32.2	31.6
Arches, etc. ..	8.0	7.8	7.3	8.2	7.8
Other light sections	29.1	33.0	40.8	44.6	45.0
Bright steel bars ..	6.2	7.6	9.4	10.6	9.6
Hot-rolled strip ..	22.6	27.4	32.9	36.2	35.5
Cold-rolled strip ..	7.0	8.0	9.9	11.0	10.6
Sheets, incl. coated[6]	41.7	47.0	52.2	58.1	56.4
Tinplate:	18.7	20.9	23.5	23.2	22.5
Blackplate	0.8	0.7	0.9	1.1	1.0
Tubes up to 16 in.	19.0	20.6	26.2	21.4	23.7
Tube fittings, etc.	0.4	0.4	0.5	0.4	0.4
Tyres, wheels, and axles	4.5	2.4	3.3	2.5	2.4
Forgings (excl. drop)	2.0	2.1	2.3	2.5	2.3
Steel castings ..	4.2	3.6	4.1	4.6	4.5
Tool steel	0.2	0.2	0.3	0.3	0.3
Total	300.5	312.0	370.3	404.6	394.7
Alloy steel	16.1	18.2	22.7	25.5	23.6
Total deliveries from UK prod.[6] ..	316.6	330.2	393.0	430.1	418.3
Add: Imported finished steel ..	7.0	7.1	9.6	14.3	10.0
	323.6	337.3	402.6	444.4	428.3
Deduct: Intra-industry conversion[7] ..	41.2	47.6	55.8	60.3	59.7
Total new material ..	282.4	289.7	346.8	384.1	368.6

TABLE 4.—*Production of Pig-iron and Ferro-alloys.*

District.	Furnaces in blast.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.
Derbys, Leics, Notts, Northants, and Essex	20	—	30.3	18.4	—	48.7
Lancs (excl. N.-W. Coast), Denbighs Flints, and Ches	7	—	22.9	—	1.5	24.4
Yorkshire (excl. N.-E. Coast and Sheffield) ..	—	—	—	—	—	—
Lincolnshire	10	—	45.3	—	—	45.3
North-East Coast ..	17	2.6	64.1	—	1.6	68.3
Scotland	7	0.4	25.7	1.1	—	27.2
Staffs, Shrops, Worcs, and Warwicks ..	5	—	10.4	1.0	—	11.4
S. Wales and Monmouthshire	10	3.6	54.8	—	—	58.4
Sheffield	2	—	3.0	—	—	3.0
North-West Coast ..	8	16.9	—	1.2	1.2	19.3
Total..	86	23.5	256.5	21.7	4.3	306.0
November, 1960[4] ..	89	23.3	262.0	25.2	4.5	315.0
December, 1959[4] ..	81	21.0	230.8	26.5	2.1	280.4

[1] Used in non-food manufacturing industries.
[2] Weekly average of calendar month.
[3] Stocks, mainly ingots and semi-finished, at the end of the year and months shown.
[4] Five weeks, all tables.
[5] Other than for conversion into any other form of finished steel listed.
[6] Includes finished steel produced in the UK from imported ingots and semi-finished steel.
[7] Material for conversion into other products also listed in this table

Baker Perkins Machinery at work . . . . . *at Peter Brotherhood Ltd.*

Peter Brotherhood Ltd. use this 'Cadet' Rotary Table Shot Blast Machine for a wide range of application at a high production rate. Note especially the control desk which includes signal lights, 24 volt current socket for inspection and ammeters indicating the shot output of the impeller. The wiring circuit is arranged for automatic operation to cut out human errors.

Baker Perkins Ltd.

Engineers

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HISTORICAL NOTE

Peter Brotherhood Ltd. were established in London in 1868. In 1907, the works was transferred to Peterborough, Northants. In their Foundry, they produce a wide range of general engineering castings for air and gas compressors, steam turbines, steam engines, refrigeration plant, water turbines, chemical filtration plants, textile machinery, brewery machinery, and many other applications

Raw Material Markets

Iron and Steel

Current outputs of pig-iron are adequate and makers could step up deliveries of all grades if demand warranted. The call from the steelworks for basic pig-iron is well sustained, and is being satisfied almost fully by home furnaces, as imports are now much reduced. The shortage of scrap continues to necessitate a larger percentage of pig-iron than that normally used in their mixtures, but this is adequately covered by available supplies.

The foundries also have no difficulty in securing all the supplies of pig-iron needed for consumption and stock, although one or two brands of low phosphorus irons and hematite are still limited in production. The easy supply position does not favour forward buying, and the foundries are content to carry only sufficient supplies to ensure uninterrupted production.

Most of the engineering and speciality foundries are well occupied in the production of high quality castings for many trades. The foundries supplying mainly to the car industry are now more favourably employed, and a number of them have been able to revert to a five-day working week. The machine tool trade maintains its demands for castings, and the heavy engineering, power and electrical plant manufacturers, agricultural implement makers, and other consumers continue to call for appreciable tonnages of high duty castings.

Many of the light foundries are only moderately employed. Demand from the building trades for castings is at a good level, but from the domestic utensil trade business is scarce. The jobbing foundries are fairly well engaged but could undertake more work, and the textile foundries are similarly placed. The high phosphorus pig-iron used by these foundries, as well as by some of the engineering foundries, is in good supply, and adequate tonnages are available from stocks held by the furnaces and current outputs. Some of the excess tonnages continue to be shipped overseas.

The foundries maintain their demand for scrap in both cast-iron and steel grades, particularly for the better and heavier types of cast-iron scrap, arisings of which are none too plentiful. Foundry coke is coming forward satisfactorily and ganister, limestone and firebricks are available on demand.

Most of the re-rollers continue well occupied and substantial outputs of small bars, light sections and reinforcing rods and bars are being obtained. Current business, however, still shows a decline on that previously placed for small bars, light sections, hot rolled strip and bright drawn bars, but there is still a heavy call for reinforcing material. The re-rollers are well provided with mild steel semis and until the stocks held by them, which include consignments from overseas, are reduced there is unlikely to be any increase in the call for supplies from home steelworks. The tonnages now available at the steelworks are much in excess of present demand for mild steel semis, although the supply of carbon and alloy steel billets is not so favourable. The re-rollers continue to take up all arisings from the steelworks of suitable re-rolling defectives and crops.

Non-ferrous Metals

Tin is the chief centre of interest in the markets these days with London quietly steady and New York maintaining its recent improvement. The price is above $1.03 a lb. and Singapore is consistently strong. A helpful but expected factor has been the announcement from the International Tin Council that tin exports will remain free of restrictions for the second quarter of this year. In making this announcement, Mr. Georges Peter, chairman of the Council, said that the new agreement had only been ratified by three countries—Malaya, Australia, and the Congo. Mr. Peter felt that it was particularly encouraging that the Congo was among the first to ratify and while that country was maintaining its exports, though not at their full rate, production was virtually at a standstill.

Another bullish factor has been the revival of demand for tinplate in the UK arising from canners ordering metal to prepare for the spring. Moreover, demand fom the Continent is good and there was a lightning strike in all the Bolivian nationalized mines.

The outlook remains bright and should the US economy begin to get into its stride in the second half of this year the price of tin should reach £830 a ton without difficulty.

Copper in London is an idle market although the price for cash metal is holding steady around £225 a ton. Production is still outrunning consumption, but it is believed that the recent cut-backs in production will soon make themselves felt and bring the statistical position of the red metal into balance. The US market is quiet and the price structure unchanged with 29 cents a lb. applicable to both producers and custom smelters.

Lead in London has been a reasonably steady market on lack of sellers rather than a plethora of buyers. The tendency is for this market to go better on the belief that the Lead and Zinc Study Group meeting next week will recommend cut-backs in production. The US market is steady and the price unchanged at 11 cents a lb.

Zinc is also under the influence of the forthcoming meeting of the Lead and Zinc Study Group at which the US may suggest bartering their food surplus for the world's metal surplus of lead and zinc. Otherwise the market is weak and in no mood to absorb offerings of metal. In the US the market is without feature and the price unaltered at 11½ cents a lb.

Board Changes

SOLARTRON ELECTRONIC GROUP, LIMITED—Mr. L. Malec has joined the board as systems sales director. Mr. R. Catherall has been appointed research and development director and Mr. H. D. Binyon has been appointed product sales director.

J. G. STATTER & COMPANY, LIMITED—In succession to the late Lt.-Col. G. S. Marston, Mr. Peter Jardine has been appointed managing director of the company and of Minerva Mouldings, Limited, both members of the Metal Industries, Limited, group. He joined MI as group chief accountant in 1956, being appointed group financial controller three years later. He recently took up full time executive director duties with the two companies of which he is now managing director.

ROSE BROS. (GAINSBOROUGH), LIMITED—Following the merger of the company with Forgrove Machinery Company, Limited, a wholly-owned subsidiary of Baker Perkins, Limited, Mr. R. H. Wilkins, joint managing director of Baker Perkins, has been appointed managing director. Mr. A. I. Baker, chairman of Baker Perkins, Mr. N. Mountain, a director, and Mr. W. A. B. Brown, deputy managing director of Forgrove, have joined the board. Mr. H. S. Ridley will continue as chairman and has joined the Forgrove board.

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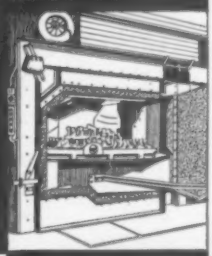

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Basis prices, delivered unless otherwise stated)

March 15, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P 10-ton lots or over, £23 5s. 0d., delivered Birmingham £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 0s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s.10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 10s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 13s. 3d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free £275 0s. 0d.; 96/98 per cent., £285 0s.0d.

Ferro-columbium.—65/67 per cent. Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £58 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t.s. 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.: hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C, £40 11s. 0d.; silico-manganese, £43 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £223 10s. 0d. to £224 0s. 0d.; three months, £225 5s. 0d. to £225 5s. 0d.; settlement, £224 0s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 2½d. per lb.; rods, 240s. 6d. per cwt. basis; 20 s.w.g., 275s. 6d. per cwt.

Tin.—Cash, £820 0s. 0d. to £821 0s. 0d.; three months, £822 0s. 0d. to £823 0s. 0d.; settlement, £821 0s. 0d.

Lead (Refined Pig).—First half March, £66 12s. 6d. to £66 17s. 6d.; first half June, £67 17s. 6d. to £68 0s. 0d.; settlement, £66 17s. 6d.

Zinc.—First half March, £86 10s. 0d. to £87 0s. 0d.; first half June, £84 12s. 6d. to £84 15s. 0d.; settlement, £87 0s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £123 5s. 0d.; rolled zinc (boiler plates), all English destinations, £121 10s. 0d.; zinc oxide (Red Seal) d/d buyers' premises, £97 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10d. per lb.; sheets to 10 w.g., 200s. 3d. per cwt.; wire, 2s. 8¼d.; rolled metal, 200s. 3d. per cwt.

Brass (Brazing).—BS1400, B3, £175; B6, £223.

Brass (High Tensile).—BS1400, HTB1, £194; HTB2, £212; HTB3, £230.

Gunmetal.—BS1400, LG2, £218; LG3, £228; G1, ½%, £292; G1, 1%, £282.

Phosphor Bronze.—BS1400, PB1 (AID released), £309; BS1400, 90/10/1, £296.

Leaded Phosphor Bronze.—BS1400, LPB1, £240.

Phosphor Bronze Strip, etc.—Strip, 287s. 3d. per cwt.; wire, 4s. 1d. per lb.; rods, 3s. 3¼d.; tubes, 3s. 3¼d.; chill cast bars, solids 3s. 3¼d.; cored 3s. 4¼d. (CHARLES CLIFFORD, LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 10¼d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 3¼d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 2¼d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2¼d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £69 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £244; AB2, £252.

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Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

MANUFACTURER'S AGENT operating in Birmingham and the Midland Counties having well established connections amongst all classes of manufacturers would like to contact a foundry who may be requiring representation on an agency basis in this area. Box MA656, FOUNDRY TRADE JOURNAL.

QUALIFIED METALLURGICAL CHEMIST, A.I.M., several years' administrative experience in modern steelworks laboratory, employing modern physical and chemical methods of analysis for all types of steel refractories etc. and ancillary sections. Also experience in foundry materials and non-ferrous analysis. Change desired, location no object. Box QM642, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER seeks position, fullest experience in grey and high duty irons, cupola and sand control, estimating and pattern design from engineering drawings, young, keen foundryman willing to accept permanent position with progressive foundry, prospects are of prime importance. Full details from Box FM651, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

FOREMAN required for modern Iron and Steel Foundry in Midlands area. Good knowledge of mechanised production most essential. Reply stating age, previous experience and salary required. Box FR637, FOUNDRY TRADE JOURNAL.

AN old-established company of Foundry Plant and Shot Blast equipment manufacturers invites applications from young FOUNDRY TECHNICIANS who are interested in entering the selling side of the industry. Full training would be given and car provided. Apply in confidence, giving details of education, experience and salary required. Box AO639, FOUNDRY TRADE JOURNAL.

ROUTINE ANALYST, age 40/45 years, required in the Bolton Area, for the analysis of cast iron, steel and non-ferrous metals. Knowledge of foundry materials preferred. Capable of working without supervision. Good salary, pension scheme, canteen. Box RA632, FOUNDRY TRADE JOURNAL.

FOUNDRY PROGRESS MANAGER required by old-established company in North Midlands producing cast iron pipes and special castings principally for gas and water undertakings, power stations, etc.; a first-class man, well experienced in the trade is required, competent to organise and control the dept. efficiently; a commencing salary of up to £1,000 p.a. is offered, there is a contributory pension scheme and the position is permanent and progressive. Applications giving full personal and business particulars (in the strictest confidence) to Box FP635, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

FURNACEMAN wanted for South London Foundry. Must be fully experienced in melting all non-ferrous specifications to A.I.D. Conditions in Morgan and Sklenar Furnaces. State full details and wage required to Box FW652, FOUNDRY TRADE JOURNAL.

Advertisers whose announcements appear under a box number are urged to acknowledge, however briefly and informally, all replies received. This particularly applies to advertisements under "Situations Vacant"; serious inconvenience and, sometimes, real hardship can be caused to applicants who receive no indication even of the safe receipt of their communication. Failure to acknowledge replies can also reflect on the good faith of this journal, which is responsible for their onward transmission. If it is desired to maintain anonymity, an acknowledgement on plain paper, quoting the relevant box number, is all that is necessary.

WORKS MANAGER for a rapidly expanding Aluminium Foundry producing high quality sand and gravity die-castings. Excellent opportunity for a qualified foundryman to join a progressive company. All replies for attention of Man. Director will be treated in strict confidence. Apply COPAL FOUNDRIES LTD., Golds Green Works, West Bromwich.

ASSISTANT TO FOUNDRY MANAGER REQUIRED

Applications are invited from men between the ages of 30 and 45 for the position of Assistant to the Foundry Manager in a modern mechanised grey iron foundry in the West Riding. The foundry produces up to 120 tons of machinery castings per week, ranging in weight from a few ounces to 4 cwt. These are produced on a fully mechanized plant with ancillary floor and bench moulding sections.

Candidates must possess a thorough practical and technical knowledge and have experience in all phases of modern grey iron foundry practice. He must have drive, initiative, organizing and executive ability and be able to control labour.

The post, which carries full staff status with contributory pension scheme, is progressive and offers scope for promotion. Assistance with housing is possible for the successful candidate.

Applicants should state age and give in chronological order full details of training, experience and positions held, with an indication of salary level.

All applicants will be treated in strict confidence and acknowledged.

Write:

BOX AA624
Foundry Trade Journal

SITUATIONS VACANT —*contd.*

PATTERNMAKERS (wood or metal) required. Rate 7s. 8d. per hour, plus quarterly output bonus for right men. STANDARD PATTERN CO., LTD., 25a, Broadwall, Stamford Street, S.E.1. WAT. 6875.

EXPERIENCED WOOD PATTERNMAKERS urgently required for master shop, in Gloucester area. Box EW646, FOUNDRY TRADE JOURNAL.

IS this your opportunity? Expanding Engineering Co. require a PATTERN MAKER to develop usage of Epoxy Resin with regard to Patterns and other equipment. Applicant should be accustomed to produce first class wood patterns. Possibility of Staff Appointment. Salary £770, plus additional payment. Give full details of experience, etc. Manchester area. Box IT644, FOUNDRY TRADE JOURNAL.

SENIOR METALLURGIST (Qualified) required for a foundry producing high quality ferrous and non-ferrous castings by investment, shell and high quality sand methods. Experience of steel casting and HF melting preferred but not essential. Contributory Pension Scheme. Details of qualifications, training experience, age and salary etc., to Box SM655, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required for iron and non-ferrous foundry in Hertfordshire. Must be active man, fully experienced in the production of castings in high grade metals by machine, plate and loose-pattern methods. Core blowing experience also desirable. Applicants must state age, experience, marital status and give indication of salary requirements. Box FM657, FOUNDRY TRADE JOURNAL.

YOUNG MAN skilled in foundry practice to assist manager of small jobbing foundry. Iron and non-ferrous. Good prospects. Box YM650, FOUNDRY TRADE JOURNAL.

SUPERINTENDENT required for Mechanised Foundry producing cast iron pipes by sand slinger. This is a permanent pensionable post and assistance can be given with housing if required. Write giving details of past experience and salary required to MUNGAL FOUNDRY MANAGER, Carron Company, Falkirk.

ASSISTANT WORKS MANAGER required for medium-sized ferrous foundry in Scotland, applicants should be between the ages of 30 and 45 years and be time-served moulders or pattern-makers with experience in the production of Blackheart malleable and grey-iron castings in a mechanised foundry. Initial duties will be to control production in the moulding and core shops and there are excellent prospects of quick promotion for the right man; salary will be in accordance with capability and experience, pension scheme and free life assurance; house can be made available if necessary. Applications, which will be treated in confidence, should be addressed to the TECHNICAL DIRECTOR, SHANKS IRONFOUNDERS LTD., Dens Iron Works, Arbroath, Scotland.

SITUATIONS VACANT—*contd.*

FOUNDRY PRODUCTION MANAGER required by expanding Ferrous and Non-ferrous Foundry on the South Coast, to act as intermediary between Works Manager and Foundry Foreman. Duties will include Production Planning and metallurgical control. Must have practical and technical experience. Permanent, pensionable post with good prospects for advancement. Box FP625, FOUNDRY TRADE JOURNAL.

SHELL Moulding Department (iron). Man with initiative to take complete control of progressive department producing 12-15 tons per week. Must have labour control experience. West Bromwich area. State age and wages required to Box SM645, FOUNDRY TRADE JOURNAL.

AN energetic CORESHOP FOREMAN is required in a South of England Iron Foundry. A good basic training in Coremaking is essential and there are good prospects for the right man. Apply Box AE648, FOUNDRY TRADE JOURNAL.

REPRESENTATIVES. Salary of £1,000, rising to about £2,000, with car and expenses provided. Applications are invited from those with ambition to join expanding Sales Organisation. Successful applicant will be required to operate from Leeds and will be responsible direct to principal. Must have sound engineering background, Degree preferred, and possess current clean driving licence. Sales experience not essential. Age 30-40. Write details to Box RS640, FOUNDRY TRADE JOURNAL.

AN opportunity exists for an ambitious JUNIOR DRAUGHTSMAN, 17-19 years old, to be employed in the Planning Department of a progressive Iron Foundry. Initial work will involve plant layouts and casting weight estimation from drawings. Training will be given in all aspects of estimating and pattern layouts. The applicant should preferably be studying for ONC/HNC Mechanical Engineering and will be allowed to further his studies. Full details to: IPOSON MOTOR CYLINDER CO. LTD., Hainge Road, Tividale, Staffordshire.

CORE DEPT. SUPERINTENDENT required to take full charge of a Core Shop making Machine Blown, Bench and Shell Cores for a foundry producing 500 tons of Automobile and similar Grey Iron Castings per week. Applicants must have of necessity, drive and ability and be capable of controlling a department employing 200 people, both male and female. Basic salary in the region of £1,150 per annum and bonus based on results. Box CD623, FOUNDRY TRADE JOURNAL.

SENIOR METALLURGIST (Qualified) required for a foundry producing high quality ferrous and non-ferrous castings by investment, shell and high quality sand methods. Experience of shell casting and HF melting preferred but not essential. Contributory Pension Scheme. Details of qualifications, training, experience, age and salary, etc., to Box SM636, FOUNDRY TRADE JOURNAL.

AUSTRALIAN OPPORTUNITY. A major concern in Australia requires DIEMAKERS with recent experience in hollow and solid aluminium die manufacture and capable of correcting dies at the press. Basic wage £23 (Australian) plus overtime and generous yearly bonus. Free transport for applicants and families and free initial accommodation offered. Write in confidence giving age and experience to WILLIAM COWARD & CO. LTD., 3 St. James's Square, London, S.W.1.

SITUATIONS VACANT—*contd.*

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WANTED.—ONE PNEULEC "Silky-sand" Disintegrator Machine. Must be in good condition. Reply to Box OP641, FOUNDRY TRADE JOURNAL.

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WANTED.—ONE W.T.B. 1A Wheelabrator. Box WO643, FOUNDRY TRADE JOURNAL.

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All above for 3/50/400-V.
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2 FREE STANDING CUPOLAS, 1 × 6 ton per hour: 1 × 4 ton per hour. Complete with 2 Wet Spark Arresters and 1 Tank.

PENDULUM CONVEYOR (Approx. 500 ft. long). Spare Chain, all "A" Brackets and hangers (2 ft. 6 in. and 5 ft. 0 in. crs.). Drive and idlers (3 ft. 0 in. dia. at corners). Capacity—18 in. square box.

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TWO good Morgan 250-lb. Type "8" Coke Fired Tilting Furnaces complete with fans and motors, in use until recently in brass foundry. Apply: WAGON REPAIRS, LTD., Imperial House, Bournville Lane, Birmingham, 30.

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Large stock of Geared Ladles up to 8 tons capacity. List on request.
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British Moulding Machine size A.T.O.S.
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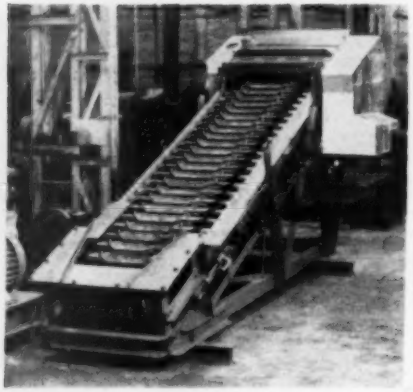

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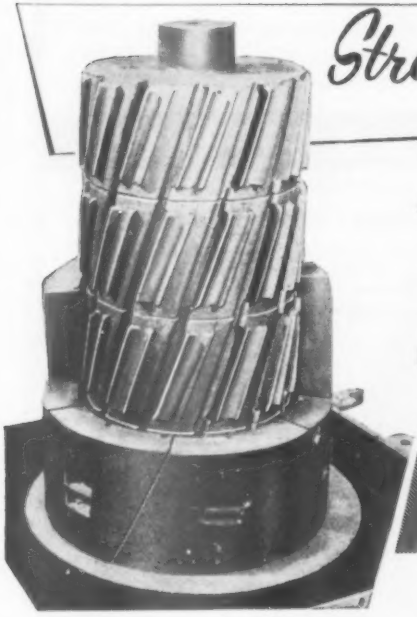

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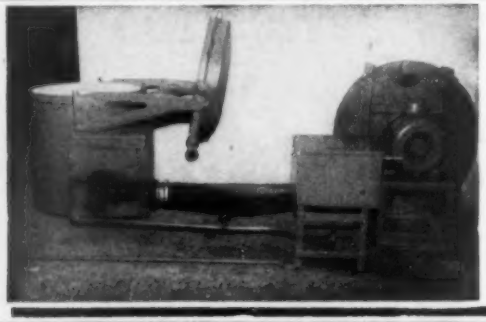

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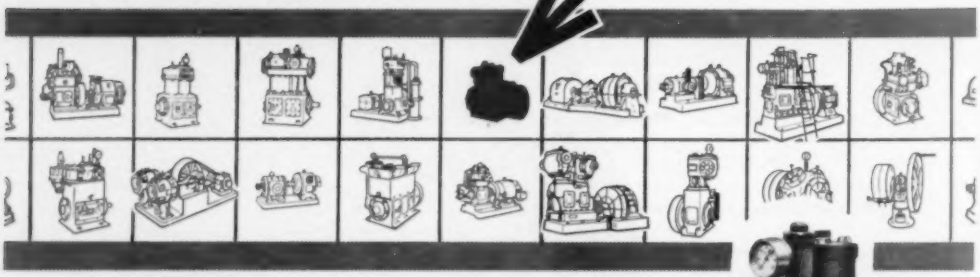

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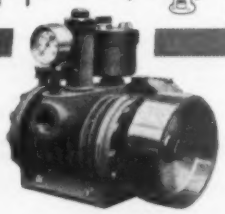

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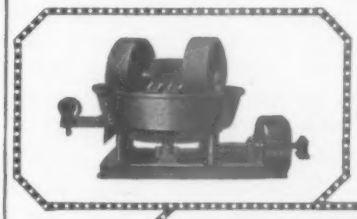

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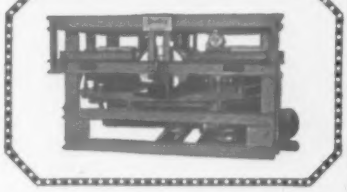

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